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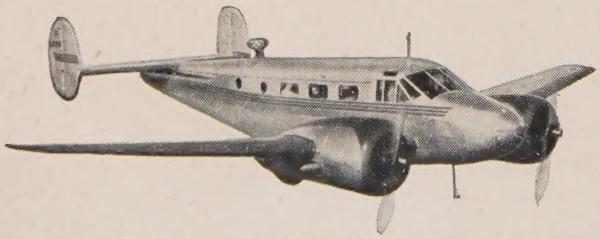

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AIRviews

"Maintenance of a healthy and expandable aircraft industry is required for national security," concludes a review of our national air policy by the Congressional Aviation Policy Board.

We in the aircraft industry heartily concur with this conclusion, because we realize the value of *continuity* in this business. And only with Government cooperation can the continuous, large-scale development of aircraft of both combat and transport types be carried on.

We know that continuity of "know-how," when carried from model to model or even on re-orders of the same model, is the largest single factor in the reduction of aircraft costs. And we know there is also pronounced reduction in engineering, development, tooling and manufacturing costs where a program calls for volume production and quantity use of aircraft.

I have always been and continue to be confident about the longer-range prospects for passenger and cargo transportation by air.

In the meantime it would appear sound public policy for the Government to bear a proper share of development and production costs of new air transports and cargo planes, in exchange for the assurance that in an emergency it would instantly have available for defense and military operations, the largest and the most advanced fleets of air transports in the world.

Donald W. Douglas

PRESIDENT
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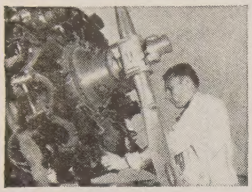

NOBODY in America wants war. But none of us can afford to overlook its *possibility*. Now is the time to consider just how such an eventuality might affect you.

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AIR YOUR VIEWS

Who's a Knucklehead?

Gentlemen:

Here's a copy of a dispatch received by teletype from United Press for radio station use and presumably duplicated for newspaper wires:

LOS ANGELES — THE DIRECTOR OF AVIATION IN LOS ANGELES COUNTY BELIEVES THAT AN AIR-MARKING SYSTEM IN CALIFORNIA WOULD BE A WASTE OF TIME AND MONEY. COLONEL WILLIAM J. FOX TOLD THE CALIFORNIA AIR POLICY CONFERENCE TODAY —"THERE IS NO SENSE IN SLOPPING A LOT OF PAINT OVER CALIFORNIA ROOF-TOPS TO HELP KNUCKLEHEAD PILOTS WHO DON'T BELONG IN THE AIR ANYWAY." FOX SAID THE FUNDS COULD BETTER BE SPENT ON AIRPORTS AND NAVIGATION AIDS.

This seems a strange statement to come from the top aviation official of Los Angeles County, which is certainly an aviation center of the U. S., and which undoubtedly gains considerable revenue both directly and indirectly from private flying. Certainly California drivers, whose reputations are one of the shames of the "Golden State," have not been penalized in regard to highways and highway markers because of their careless and reckless driving.

Col. Fox's statement, in my opinion, shows lack of judgment, a very narrow viewpoint and, on top of that, is contradictory to his advocation that the money be spent on navigation aids rather than air-marking. I wonder what he considers air-markers?

For a public official whose very job depends to a certain extent on the private flyer, Col. Fox's attitude might best be summed up as biting the hand that feeds him."

BOB DAY

Station KSMO, San Mateo, Cal.

Thanks, Bob Day, for bringing this to our attention. It's just another example of so-called aviation people selling their own business down the river. This office bets air-marking will be accomplished despite the Colonel's apparently thoughtless arguments. Good judgment and common sense are bound to win out eventually.—ED.

G Query

Gentlemen:

When they say a plane is stressed for 1 g, 2 g's, etc., what is meant? What is the speed of 1 g, 2 g's, 3 g's, 4 g's, etc.?

Also, I would like to see a pilot's report on the Aero-Flight *Streak* and the Temco *Swift*. I hear the *Streak* gets 30 miles to the gallon of gasoline and has a top speed of 270 mph. Is this true?

B. BAGBY

Dallas, Texas

The letter "g" is the symbol that refers to gravity. A "g" in a flyer's vocabulary stands for one times gravity. To the aviation engineer the g represents the load factor a plane can withstand. Aeronautical experts refer to one g as the normal weight of an object under standard conditions. They say that we as individuals have been withstanding one g all our lives, but that when we come down an elevator and stop quickly, we withstand two g's . . . or two times gravity . . . and our weight is momentarily increased two fold. When an engineer states that a plane is stressed to withstand 10 g's, he means that the plane was built strongly enough to take a force 10 times its weight, and still hold together. Take a test pilot flying a fighter plane, for example. If he puts that plane, weighing 7 tons, into a dive and registers 5 g's on the pull-out, that means the 7-ton plane actually withstood a strain of 5 times its weight . . . or 35 tons. The pilot, weighing 200 lbs., has had to withstand the strain of five times his weight . . . or 1,000 pounds. All this is for but a moment, however, and no damage results. If you still have a copy of SKYWAYS for September, 1945, there's an article in it that explains g's in complete detail. About the Aero-Flight Streak, *according to its builder its top speed (at sea level) is 203 mph and its fuel economy varies from 34 to 18 miles per gallon.*—ED.

Mooney Single-Seater

Gentlemen:

Regarding the Mooney single-seater with the Crosley engine, in my opinion this is what every flyer is wanting provided it can be turned out in quantity production at a very low cost. Its low up-keep, low initial cost and low fuel consumption is ideal for a time builder-upper, and its safety in landing at slow speeds is ideal. Let's boost this ship and get it into production at once. I noticed the gear was retractable. I believe it would sell just as quickly with a fixed gear, thus lowering the cost. And why not use a cross-wind gear?

J. W. SYMONDS

Fontana, Calif.

Judging from letters we've received, there certainly is a need for a plane such as the Mooney single-seater.—ED.

Right Prop — Wrong Pitch

Gentlemen:

In your April issue, you listed the Piper *Super Cruiser* at $2,495.00. Sounds low to me.

J. I. BEECH

Neligh, Neb.

Gentlemen:

In your May issue, you state the TBF *Avenger* is powered by a "2600-hp Wright engine." That's the cubic-inch displacement of cylinders, not the horsepower.

G. CLARK

Brooklyn, N. Y.

Yes, we were wrong on both counts . . . and the caption writer is now doing time on the bull ring. The Piper Super Cruiser *sells for $3,495.00; the horsepower of the* Avenger's *engine is 1700; and the correct cruising speed of the Bellanca* Cruisair Senior *is 153 mph at sea level (we beat you to the draw on that one). Range of 600 miles was correct.*—ED.

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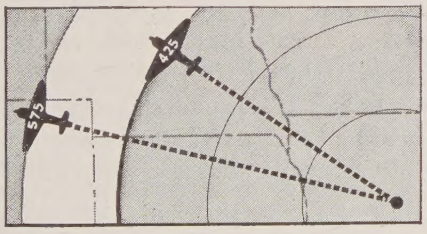

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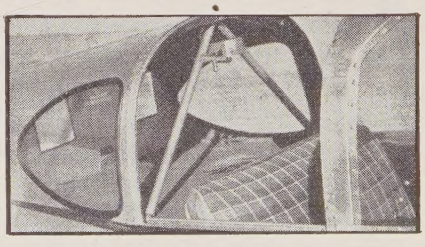

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Swift 125

USAF NEWS

THERE'LL be no more "Privates" in the Air Force and top-grade Warrant Officers will get the same pay and allowances as a Major if USAF's proposed "Airman Program" is implemented. Outlined for information purposes in a recent USAF Letter (35-39, April 19), the program is still in a "tentative stage, subject to improvement and revision," according to USAF Headquarters. The big reason for the "tentative" is that some parts of the program still require legislative approval.

If approved by Congress, the program calls for four grades of Warrant Officers to rank below second lieutenant. They are: Chief Airman (pay of major), Senior Airman 1st Class (pay of captain), Senior Airman 2nd Class (pay of 1st lieutenant), and Senior Airman 3rd Class (pay of 2nd lieutenant). The proposed new titles for the six enlisted grades leading up to WO status, with the same pay scale as at present, are: Airman 4th Class (or Airman), Airman 3rd Class (or Airman 1st Class), Airman 2nd Class (or Air Corporal), Airman 1st Class or Senior Air Corporal), Air Sergeant, Air Sergeant 1st Class, and Senior Air Sergeant. The alternate titles given in parenthesis may be adopted in place of those now proposed.

The new enlisted job titles and the new opportunities for warrant officers are just a small part of the over-all "career" program which would establish a definite plan of assignment, training and orderly advancement for qualified enlisted personnel based on "ability, integrity, and initiative."

MORE than 3,800 Air ROTC students from colleges and universities throughout the country will report to one of nine USAF bases during June and July for six weeks of full-time summer camp training. The trainees, who have completed the first three years of the four-year Air ROTC course, are part of the more than 21,000 college students enrolled in the course at 96 schools. This year, USAF expects to offer Regular commissions to more than 100 outstanding Air ROTC graduates.

USAF Major General Lucas V. Beau, National Commander of the Civil Air Patrol, has begun the nationwide presentation of Air Medals to 824 members of the CAP who flew active duty missions with the coastal patrol during the early months of World War II. Flying from March, 1942, until August, 1943, CAP patrols sighted and reported 173 Nazi subs, attacking 57 and actually sinking two. Twenty-six men and nearly 100 airplanes were lost during the anti-sub campaigns by the Civil Air Patrol.

USAF has announced that Air Force Day this year and in the future will be celebrated on September 18, first anniversary of the creation of the independent US Air Force. . . . Now being trained in this country at USAF bases are 45 Turkish Air Force officers and 50 Greek Air Cadets. The Turkish officers are taking on-the-job technical and staff training at bases of USAF's Tactical Air, Air Materiel and Air Training Commands. The Greek cadets are receiving aviation cadet training and are scheduled to graduate in February, 1949. . . . First of the approximately 50 German scientists now working in the US for the Army, Navy and Air Force to obtain an immigration visa is Dr. Heinz Eugen Schmitt, a jet propulsion expert now working at USAF's Wright-Patterson Air Force Base. . . . USAF has announced that the Boeing XB-47 *Stratojet* recently completed the first phase of its flight test program at Moses Lake Air Force Base, Washington. USAF pilots of Air Materiel Command will now conduct Phase Two testing. . . . The TF-80C, a two-seater trainer version of the Lockheed P-80 Shooting Star, has passed preliminary flight tests at the Lockheed plant in Burbank, California. . . . USAF has awarded a $1,500,000 engineering and tooling contract to Curtis-Wright to equip itself for early production of its four-engine, 600-mph, all-weather jet fighter, the XP-87. . . . Scheduled to come off the presses in late June is Volume I of the official USAF History of World War II. The first of seven volumes being prepared by USAF's Historical Office and the University of Chicago, it will cover the air war up to August, 1942.

ON March 29, Air Force Chief of Staff Carl Spaatz wrote a brief, three-paragraph letter to his boss, "Stu" Symington. "In accordance with my previously expressed intention to you some months ago," he began, "I request that I be relieved from active duty . . ." The fighting airman who had commanded more men in *(Continued on page 50)*

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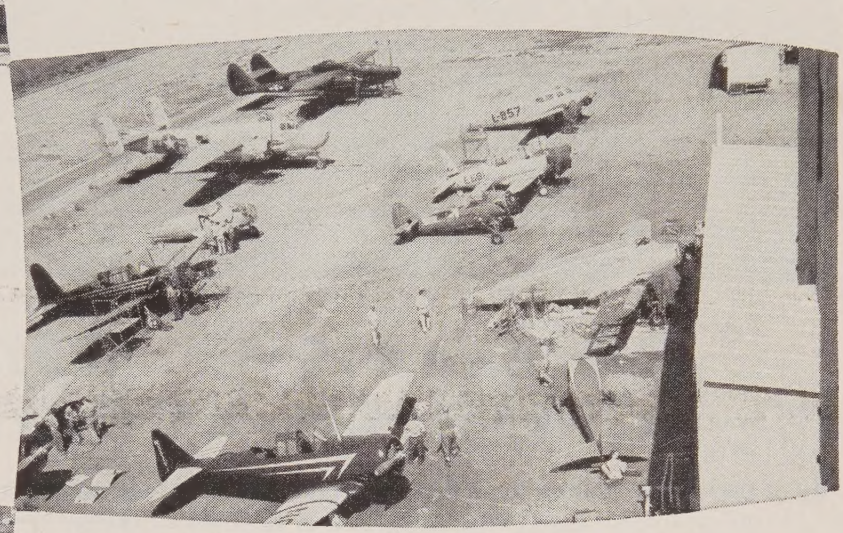

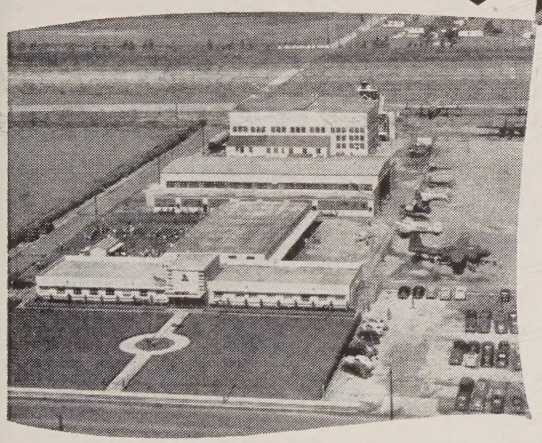

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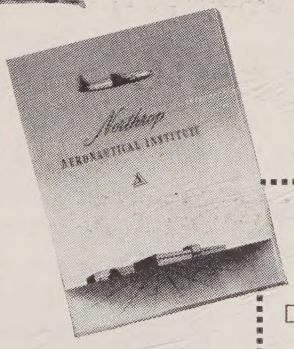

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NAVAL AVIATION

INCREASES in Naval Aviation which have been requested from Congress by the Navy include an addition of 13 attack air groups to bring the total up to two groups for each of our 12 operating carriers, adding four more air hunter-killer anti-submarine groups to the four we already have, increasing our training output of pilots from 900 to 2,300 per year, reactivating nine air stations, and purchasing 505 additional combat aircraft in fiscal 1949.

GOLD wings beckon again. Flight training in naval aviation is open to civilian college graduates under a new program initiated by the Navy. Applicants may be non-GI's or ex-GI's who have completed their college education since leaving the service. Those who successfully complete the 18 months' flying course will be commissioned officers in the Regular Navy. Men interested in the 650 available openings may contact either the Professor of Naval Science at their college or the commanding officer of the nearest Naval Air Station or Reserve Naval Air Station. Age limit is 19 to 25 as of July 1 of the calendar year when commissioned.

AT THE White Sands Proving Ground, Las Cruces, New Mexico, the Navy's *Aerobee* Rocket was sent streaking up to probe the skies at a speed nearly four times faster than the speed of sound. It was the first American attempt to measure the earth's magnetic field 78 miles up. The knowledge of this magnetic field at high altitudes is of great importance in connection with the navigation of future guided missiles. The *Aerobee* was developed for the Navy Bureau of Ordinance by the Aerojet Engineering Corporation of California.

TAKE it easy on the suntan, pilots! That masculine tan may wow the ladies on the beaches and the tennis courts, but it decreases your efficiency when flying an airplane. A forthcoming report by Captain Ashton Graybell, Lt. John Patterson, and Lt. (jg) John Packard, doctors at the Navy Medical Corps' School of Aviation Medicine, indicates that sunburn of the ordinary afternoon-at-the-beach variety increases susceptibility to blackout and postural fainting in flight. Studies made by the three doctors show that the total area sunburned and its location are factors bearing on the matter. Navy flight surgeons may soon warn their pilots against excessive exposure to sunburn. The athletic programs in future flight training courses may also be affected by this new opinion regarding sunburn.

MORE than peas, beans, and tomatoes come in cans in the Air-Navy. Thousands of aeronautical items such as gaskets, diaphragms, ring glands, hydraulic and fuel pumps, instruments, electronic spare parts, electrical circuit breakers, and anti-friction bearings are now delivered from the manufacturer to the Navy packaged and preserved in hermetically sealed metal containers. This new packaging program developed by the Aviation Supply Office of the Navy Department results in maximum effectiveness at minimum cost in the preservation of aeronautical materials in all kinds of weather all over the world.

THE latest personnel figures of the aviation division of the Marine Corps are most interesting when compared with similar figures at the peak of World War II. The total personnel connected with Marine Aviation now is 13,325 or about one-tenth of the 125,162 they had during the war. The numbers have been slashed in all categories but one. In the group of airplane pilots who are non-commissioned officers, the Marines now have six times as many: 361 as compared to only 63 during the war.

THERE'S never a dull moment for the aerial photographer. The Navy's flying lens boys are now doing tail chases on guided missiles to photograph their behavior in flight. The special nose compartment camera installation of one 35-mm Mitchell and two 16-mm Cine Kodak Specials was designed and constructed for guided missile photography at the Naval Air Ordinance Test Station, Chincoteague, Virginia. The twin-engine F7F-3N Grumman photo planes trail the "Bats" at a distance of 100 to 150 yards after their release from the parent aircraft. Yes, it's much more fun than taking pictures of the squirrels in the park.

THE big carrier, *Coral Sea,* recently left port on a cruise. Vital statistics are interesting: she has a crew of over 3,000, has 2,400 miles of copper conductors, 2,000 telephones, carries over 100 planes, including several jets.

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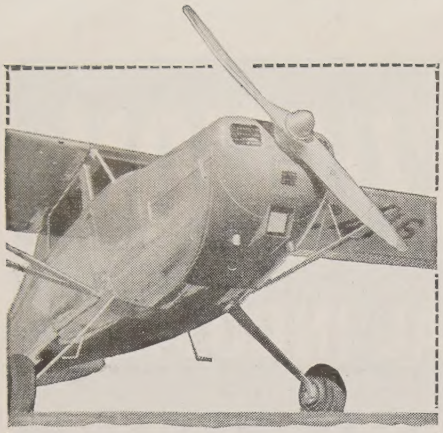

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Aero Oddities

Lucky Strike. Private pilot with only 60 hours took off from Grand Rapids under CAVU conditions, climbed to 7000 feet to get over clouds he was approaching, proceeded on course by compass heading for one hour 35 minutes, last hour of which was above solid overcast. At exact minute of his ETA, he let down through hole in overcast, was directly over his destination, Alpena Army Air Base, with cloud level at 1,000 feet above field. *(L. E. Barnum, Alpena, Mich.)*

Tail Down. Returning from a business trip, a pilot decided to stop and visit a friend before he returned home. Upon landing at the airport, he discovered he'd lost his tail wheel in flight. Reporting the incident to his friend, pilot learned tail wheel had fallen in friend's backyard. *(B. Sheppard, Troy, Alabama)*

O Solo Mio. Upon being told he was to have a new flight instructor, a student pilot approached a middle-aged man standing near a *Cub*, and exclaimed, "Okay, Pop, ready to take-off?" Man agreed. Once in the air, student pilot was silent, concentrating on his flying skill to properly impress new instructor. Back down on the ground 30 minutes later, student climbed out of ship and then asked, "Did I do all right . . . do I get to solo now?" The man shrugged his shoulders, replied, "I dunno . . . I came out here to start learning to fly myself." *(G. M. Totten, Ionia, Mich.)*

Water Boy. Landplane instructor wanted to get seaplane rating, so took instruction at base not far from airfield. Out on 30-minute solo hop in T-craft on floats, landplane instructor failed to return. Hour later, phone call came from nearby land-base — Instructor has spotted two of his students doing buzz job. Angered, he'd followed them back to airport, flown traffic pattern and landed floatplane on field. *(A. E. France, Charleston, W. Va.)*

Good to Last Drop. After bucking sudden Texas wind storm into El Paso, a PT-17 pilot on a ferry trip landed ship for gassing up. When field attendant handed pilot the gas bill, it was for 47 gallons. PT-17's gas tank capacity is 46 gallons. *(K. Harvey, North Hollywood, Calif.)*

Business & Pleasure. College student W. M. Kearny and passenger, Dr. W. Mac Gilvra, took part in recent New England Air Tour. Were 200 miles away from campus when final math exam time came. Kearny flew back to college, took final exam while his doctor-passenger cared for ailing patient, then both rejoined Air Tour and arrived at destination ahead of others. *(E. R. Kearny, Worcester, Mass.)*

First Flight. Latest Soviet claim is that an airplane was flown in Russia 25 years before the Wrights flew at Kitty Hawk. *(H. Helfer, Arlington, Va.)*

Double Flip. Student pilot George Mitenko's plane, on first solo flight, was caught in slipstream of another ship that came in under him while in landing glide. Mitenko lost control, plane did double flip, then landed right side up on turf alongside runway. Pilot was damaged, plane wasn't. *(A. Argyle, Edmonton, Canada)*

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

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FORMATION FLYING with P-84's is not difficult, even at high speeds, except during rough weather when combination of "bumps" and speed pose problem. Lt. Col. L. W. Chick, Jr. *(below)* is deputy commander of Group

THUNDERJET SQUADRON

By JERRY LEICHTER

WINTER SNOW, below zero temperatures was the "obstacle course" P-84's overcame in breaking-in operations at Dow Air Base, Bangor, Maine. Despite extreme cold, the Base mechanics *(below)* kept the jets operating

WING TANKS used on the *Thunderjets* are made for use on either right or left wings, Tanks hold 185 gallons

The AF'S Thunderjets *pass gruelling operational test at Dow Field, Maine*

NO seer knows the minute when a shot may be fired and the peace lost. If the direct prophecies are valid, neither the part-time soldier nor the blueprint projectile will have time to be effective protection against defeat and slavery.

The muddle of move and countermove in the present stage of malignant international bluster has partially obscured one factor vital to U. S. security today and tomorrow. Critical future planning must be realistically projected on a dependable base of proven tactical equipment and professionally capable men.

Has the United States an effective qualitative core for quantitative strength? Neither one observer nor one report on one aspect of military power can give the answer, but the trends can be clearly indicated.

Here is a special SKYWAYS' report on one segment of present U. S. air power. Compounded of the opinions and facts in the operations of one tactical jet fighter group, it is neither final nor objective, but it is seriously pertinent to the immediate future.

Dow Air Force Base, a bleak field near Bangor, Maine, is the present home of the 14th Fighter Wing of the First Air Force, Air Defense Command. Under its present set-up, the Wing includes the 14th Fighter Group, the tactical operating unit; the 14th Airdrome Group which does the base

DEPUTY COMMANDER Lt. Col. Chick, like most of the pilots of the 14th Fighter Wing, is a married man. Five-year-old son Charles *(above)* wears helmet like his Dad's. Both Chick and his wife, Mary, are from Texas

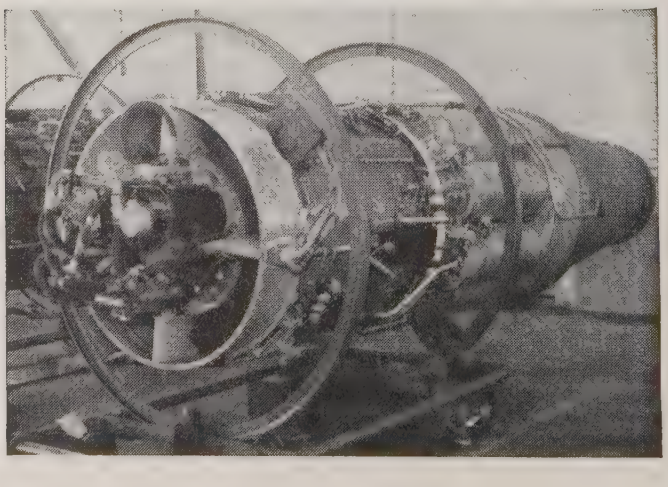
ANOTHER P-84 Group is at Shaw Air Base, Sumter, S. C. Here AF pilots plan jet delivery flight to that base

housekeeping; the 14th Maintenance and Supply Group which provides specialized maintenance for the planes and also furnishes supplies for the entire base; and the 14th Station Medical Group. Other specialized detachments round out the organization of an independently flexible tactical wing.

This survey will deal only with the prime equipment, operations and observations of the 14th Fighter Group, first in the U. S. Air Force to be equipped with Republic Aviation Corporation's new P-84 *Thunderjet*. The importance of the 14th's operations is underlined by the fact that the stated mission of the group is to guard the northeast approaches of the country.

Last winter the newly activated fighter outfit began receiving the first of its P-84's just as zero temperatures swept New England. The *Thunderjet,* an untried new airplane full of the bugs that could only be worked out in field service, was put into full use by a new group composed of some pilots whose previous jet experience consisted of check-out flights on P-80's at Williams Air Force Base, Arizona, and some who had not previously flown jets. The maintenance men included mechanics with P-80 line experience in Cal-*(Continued on page 46)*

JET ENGINES get top overhaul at Dow. The jet engine change on a P-84 can be made in less than one hour



ON THE AIR again, but not nation-wide, Edgar Bergen tells his co-pilot McCarthy there'll be no back-seat flying

The Co-Pilot's a Dummy

By CHASE CRAWFORD

"HEY Bergen . . . ! When're we going flying again?"

"Now Charlie, I don't believe I should take you up with me any more after what you did last time."

"Last time. Oh, oh . . . ! But we sure had fun, eh Bergen?"

"It may have been fun for you, Charlie, circling Dorothy Lamour's swimming pool while she was taking a sunbath, but why did you drop our camera? After all, I didn't lose the binoculars!"

While this dialogue never came over Edgar Bergen's Sunday radio show, it could easily have gone on the air. The popular ventriloquist has been flying for 10 years, holds a commercial pilot's license, owns two airplanes and has a lease on an airport near Los Angeles.

BERGEN, at controls of BT-13, was photographed from the rear cockpit

When Edgar Bergen taxies his Vultee BT-13 up the ramp of any large airport in Southern California, the radio control tower operator may call NC-63214 and ask, "Who's the co-pilot?"

"Then I let Charlie talk back to him," says Bergen with a sly smile.

Painted on each side of Bergen's two planes is a silhouette of Charlie McCarthy, monocle,

top hat and all. He hangars his Fairchild 24 at the Culver City Airport, five miles from his Beverly Hills home. His $750 BT-13 ("I paid $3,000 to have it put in good shape, but the original airplane was a bargain") is stored at the Grand Central Airport in Glendale, only a few minutes drive from his Sunset Blvd. office. He is now seriously considering the purchase of a twin-engined Cessna for cross-country trips.

Just how Edgar Bergen happened to be involved in the aviation business presents an interesting insight on this Hollywood star. Bergen has set up a foundation to help finance deserving student nurses through school and aid graduate nurses to obtain specialized training. While attending Northwestern University, Bergen had hoped to become a doctor, but he paid his way through college with his ventriloquism and eventually went on the stage. Today more than 35 nurses are attending medical schools on money borrowed from this non-profit foundation.

Prior to the war, while flying from a Southern California airport, Bergen asked a commercial pilot whom he knew casually why he was working as a grease-monkey. The pilot replied that he was trying to save up enough money to get his instrument rating so that he could take an airline pilot's position. Bergen asked Tom Wolfe, then vice president of Western Airlines, why the airlines themselves didn't have instrument courses for otherwise qualified pilots. The answer was that the airlines were already engaged in enough route and transition training for new pilots without actually issuing instrument ratings, so the pilots had to get their licenses on their own funds.

Bergen then took the responsibility of financing a number of potential airline pilots through existing instrument schools. As the program expanded, Bergen set up his own school at the East Los Angeles (formerly Montebello) Airport. Over 200 ratings were issued from this field before the war, 28 of them on a straight loan basis.

When the war broke out, nearly all the pilots trained at Montebello went into one of the Ferrying branches of the Service. The airport, adjacent to downtown Los Angeles and well within the western defense zone, was closed for the duration. It later became a depot for surplus oil drums and aircraft belly-tanks.

When private flying was again permitted in Southern California, the East Los Angeles Airport was re-opened by Jim Most and Earl "Salty" Bacon. Today Edgar's brother, Clarence Bergren, actually operates the field. Bergen's real name is Bergren, and he can speak Swedish well enough to have been featured in a musical comedy in Stockholm during a world tour.

Mrs. Bergen, the former Frances Westman, flies with her famous husband on many X-C trips, and is now a licensed pilot. Without Mr. Bergen's knowing it, Frances took flying lessons this past spring and won her private ticket. Bergen couldn't have been more surprised if Charlie'd done it.

On a trip to Vancouver, B. C. last summer, Bergen and his wife became lost over the mountains of southern Oregon. This, of course, was before Mrs. Bergen knew how to fly and was, according to the ventriloquist, when Frances could only "keep the airplane right side up while I hunted for maps or adjusted the radio."

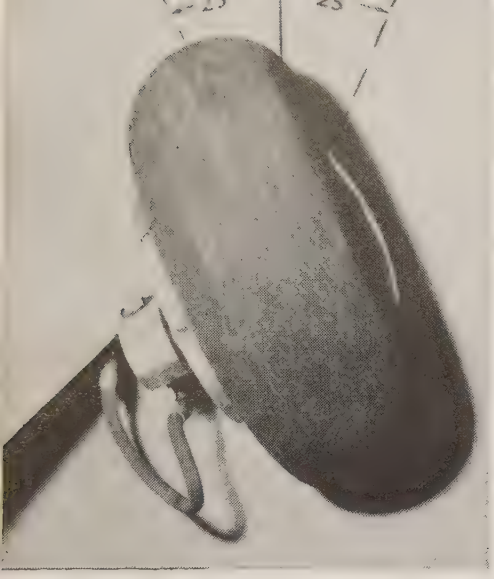
"I was curious to see *(Continued on page 53)*

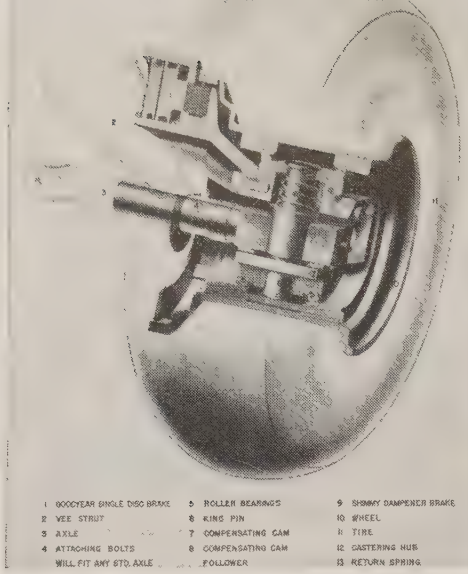
EAST LOS ANGELES airport is owned, via lease, by Edgar Bergen. Formerly called Montebello, field is 10 miles from downtown Los Angeles. In addition to operating this field, the flyer-ventriloquist has set up his own flight school

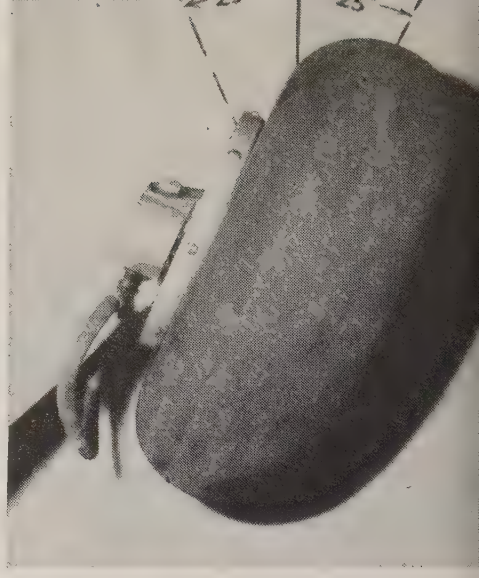
AIRPLANES owned by Mr. Bergen carry silhouette of Charlie, complete to monocle, top hat and all, like this on BT-13

EXCELLENT PILOT, Mr. Bergen always gives his ship methodical pre-flight. He also always wears 'chute

McCARTHY doesn't always ride co-pilot . . . he often goes along in a suitcase. Mrs. Bergen also enjoys flying







DEGREE of pivot in a castered landing gear is shown in these pictures *(left and far right).* Both wheels caster up to 25 degrees on either side of center on lightplanes. Cut-away drawing is of Goodyear's gear

CASTERED GEAR . . . for

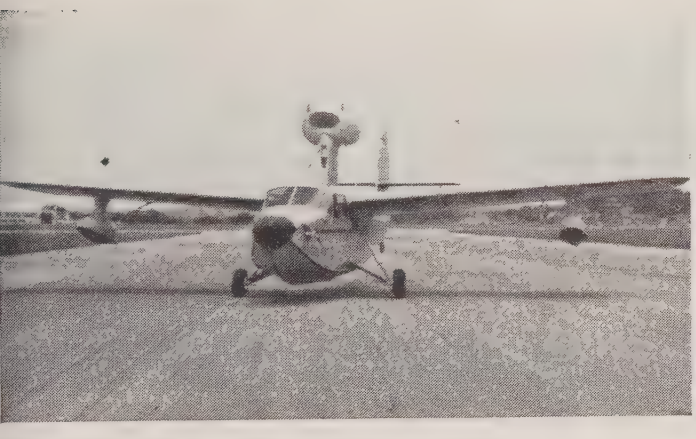
DOUGLAS DC-3 was first large transport to be equipped with the crosswind gear. The weight of the DC-3 and its higher landing speed reduces amount of pivot of the castered gear to 15 degrees instead of usual 25

GEAR developed for the Bellanca by Bellanca is a dual-wheel type. This arrangement eliminated shimmy of gear

WHEELS on the Bellanca crosswind gear are smaller than original wheels. The gear swivels inside its oleo strut

SAFETY & SAVING

TAKE-OFF view of Goodyear's amphibian GA-2 shows the action of the gear on take-off in an 18-mph crosswind



PIPER CUB, equipped with a castering gear, uses gear's full pivot of 25 degrees in taxiing in a crosswind

By ALICE ROGERS HAGER

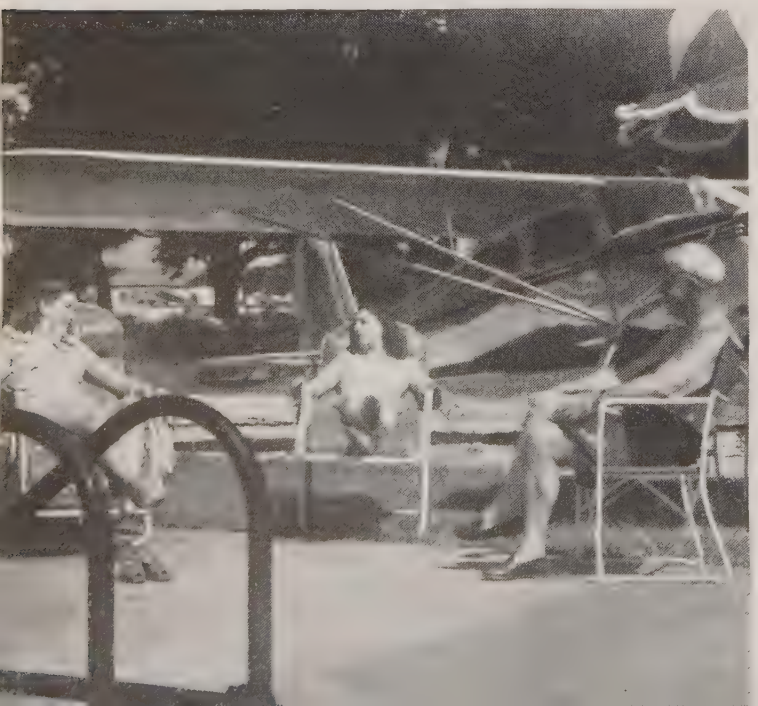
THE new crosswind landing gears, developed by various companies under contract with the Civil Aeronautics Administration, may well prove to be the answer to the most difficult aspect of the airport problem. At a time, when Federal funds must go to big, heavy-duty fields for outsize transports and bombers, this simple device can make possible inexpensive, single-runway fields for small cities.

In a word, if planes of all types, except the very largest, can be equipped with the crosswind gear, they will be able to land quite safely under any wind condition and on a single runway, the direction of which is chosen for reasons of economy. Airports can be moved in closer to the center of population because available money can be spent on a smaller, higher priced piece of land. It is axiomatic that the closer you come to the center of a town, the greater the cost of property. If your airport requires three or four 4,000-foot runways, you are going to have terrific expense coupled with great difficulty in finding a close-in location with enough unobstructed space.

Most small cities simply cannot afford the luxury of such an outlay from corporate funds, and there is now little chance of their getting further Federal aid so long as the interna-*(Continued on page 39)*

OWNERS of the Flying L Ranch are Col. and Mrs. Jack Lapham. Popular airpark is located at Bandera

FOLLOW-ME JEEP comes out to direct you to tie-down area just as soon as your wheels touch down on field. Relaxation is then in order. Popular pastime for flyers is a swim in the Flying L's pool near the edge of the field



AIR VIEW of Flying L Ranch shows quonset hangar for light-

Sky Ranch

By JOE JAMES

Col. Jack Lapham's Flying L Ranch at Bandera, Texas, was made for pilots who enjoy flying weekends

FROM three thousand feet the broad level cotton lands of Central Texas stretched southward like a giant checkerboard of rich greens and browns. The early morning sky was glassy smooth, still unrippled by upsurging thermals. It was a grand day for flying and Peg and I, off on a flying weekend at the famous Flying L ranch in the Bandera hill country, joined the overhead speaker in appropriate close harmony:

"The prairie sky, is wide and high—clap, clap, —deep in the heart of Texas . . ."

This was the way to take a week-end trip. A short drive to the airport near our suburban Dallas home, load bags and camera aboard a gassed and waiting Cessna 140, run 'er up, check the mags,

lanes, long building for twin-engine ships, and the pilot's lounge

COWBOY as a guide, many flying visitors to this airpark ride on horseback over the Flying L range

PILOTS' LOUNGE is complete with music and an airport manager who can call "Cotton-eyed Joe" for the dancers. Overnight guests rent tiny cottages *(below)*. Each one has two bedrooms, adjoining bath, and a living room

and you're off. No traffic, no stop lights, no detours. By automobile, the 300 air-miles from Dallas to Bandera would mean at least six hours of steady driving—our little two-place 85-hp plane would put us there in an easy three hours. Six hours of flying, for example, would put the dude ranch country within easy reach of lightplane owners in El Paso, Amarillo, Tulsa, Oklahoma City, Shreveport, or New Orleans. Eight hours of flying—still at a moderate 100 mph—would put the Flying L within reach of pilots in Albuquerque, Santa Fe, Tuscon, Memphis, and Mobile.

Flying southward above rich farm lands, we were soon over the Alamo City of San Antonio. Now we turned west where a broad valley beckoned beyond rolling hills. Over the valley 15 minutes later, we spotted the winding river which the map promised would lead us to the Flying L. Turning northward, we followed the twisting river as it threaded lazily through rolling ranch country. We were over the Flying L before we saw it.

Snuggled in a rustic setting, the novel airpark was carefully laid out to make good use of trees, chapparal, and mesquite. This makes it difficult to spot from the air unless you follow the river as we did. Best procedure on your first trip is to fly west from San Antonio to vast Medina Lake, then follow the river northward to Bandera and the Flying L.

As we landed our trim little Cessna, a "follow-me" jeep raced to meet *(Continued on page 40)*

CABIN of the Cessna 170 is spacious and comfortable. Its yard-wide door makes for easy entrance to cabin

BACK SEAT can be removed to allow over 50 cubic feet of cargo space. Righthand front seat also comes out

Pilot's Report..

CESSNA 170 handles like "140" in landing operations. Flaps are smaller than usual but offer good glide control

NIGHT FLIGHT in "170" proved that correct sequence of switches on instrument panel should be memorized

CESSNA "170"

Test flights prove new Cessna to be efficient and well thought-out plane

By DON DOWNIE

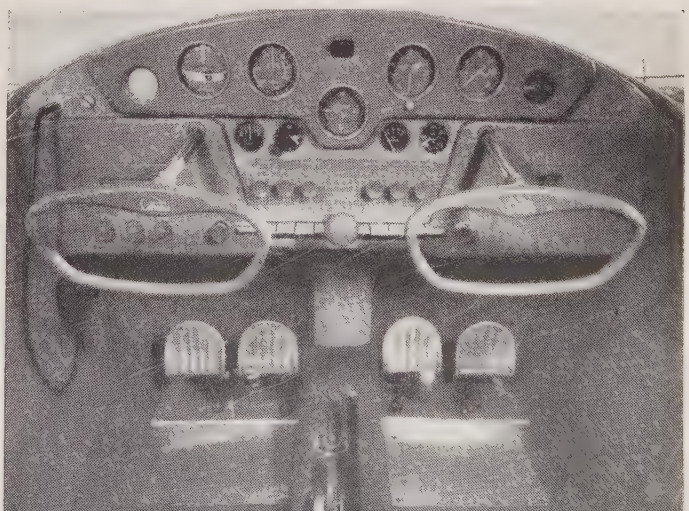
(Editor's note: The current sure-sale on today's airplane market is the four-place personal airplane. As an impartial survey, SKYWAYS *begins a series of pilot reports on new entries to the four-place market. This month we preview the Cessna 170.)*

ON a moonlit night such as songwriters dream about, a sleek new plane eased off the runway at the Wichita Municipal Airport. Inside the cockpit of this four-place "plush job," dim red instrument lights blended into the half darkness beyond the runway lights. Air speed 85, rate of climb nearly 700 feet per minute—and all with the efficient luxury of a well thought-out airplane.

This was our second hop in Cessna's "170." Earlier in the day, Derby Frye, Assistant Sales Manager for Cessna and a pilot for 20 years, showed us the inner-workings of the "170" in one of the two original prototype models. By the time this story is in print, this particular airplane (NC 41692) will be junked. Mr. Frye explained that it was a hand-built model and none of the precision-stamped parts that go into the production models would fit this experimental plane.

The "170" has so many features of the current two-place "120" and "140" that it takes a second

THREE ABOARD and with your pilot-reporter at the controls, the "170" showed itself to be first-rate airplane for day or night flying. Instrument layout in "170" is like that of Cessna's two-place Model 140



FAMILY LINE at Cessna now numbers three models: the "170" *(above)* is powered by 145-hp Continental; the "140" *(below)*, with author's wife at controls, is a two-placer powered by 85-hp Continental; and "195"

look to assure the visitor that he is really looking at a four-place plane. This similarity of models is the result of a long-range program started by Cessna in January, 1945, to furnish a series of planes in different price brackets to fill nearly all the needs of the aircraft buyer.

So many parts are interchangeable on the "140" and the "170" that a first impression confusion is justified. The spring-steel landing gear is identical on both models. The wing ribs are the same although the "170" has six more ribs in each wing panel. The rear strut on the "170" is the same as the front strut on the "140." The complete tail assembly; rudder, elevators, stabilizer and fin is pirated from the five-place "195" model. Nose cowlings, control columns, tail wheels and instrument panels are all interchangeable. Even the tires and gas tanks are the same. In all, 40 per cent of the parts in this new model are taken from one of the other line of Cessna aircraft. Obviously this design cuts down the final cost of the "170" since it enables the manufacturer to purchase larger quantities of pre-fabricated parts and use the same tools and jigs for both models.

So the "170" is just a "blown up 140," you say.

Not at all! Once you open the yard-wide door of the "170," you can see plenty of difference. The popular cabin interior design has been continued and improved to fit the needs of the "170." Both front seats have rollers on a track and can be moved for easy entrance to the cockpit. The back seat is easily removable to form over 50 cubic feet of baggage space, and the right hand seat may be taken out for cargo work by merely sliding it back off the track. Safety belts, are snubbed into the floor so there is no chance of pulling a seat loose in an emergency. *(Continued on page 42)*

BIG SHIP on company's assembly line is five-place "195" powered by 300-hp engine; "190" has 200-hp

GROUND FORCES observation plane, the two-place Boeing XL-15 offers performance, excellent flight stability

BOEING XL-15

PLANE'S swing-out doors can be opened in flight to drop supplies or messages to ground units

THIS strange looking mechanized "bug" is more of an airplane than a first glance would indicate. Designed and built by Boeing for the Army Ground Forces, the XL-15 is a ship that combines safety and versatility with performance and utility. Powered by 125-hp Lycoming engine, the XL-15 cruises at 101 mph, has a landing speed of only 35 mph, and a service ceiling of 16,000 feet. It can take off and clear a 50-foot obstacle in under 600 feet.

The unique "gondola" fuselage affords excellent full vision in all directions. The observer sits directly behind the pilot. Full-swivel seat and lack of visual obstructions in the plane give the observer 360 degrees of visibility. The ship's inverted tail not only aids this visibility but gives increased flight stability. The ship's landing gear facilitates operation out of small rough fields. Either skis or floats or Brodie gear for cable landings can be attached. The XL-15 can be quickly disassembled and loaded on a standard two and a half-ton Army truck.

COCKPIT of Boeing XL-15 is dial- and knob-laden, includes radio equipment. The observer faces to rear

NEW LOOK liaison ship, the XL-15 has a short-coupled three-wheel landing gear for rough-field operations

A Lesson in Dusting

By H. J. ARNOLD

STEARMAN powered by 300-hp Lycoming engine is professional crop-dusting plane. Note long exhaust stack

I MET Joe O'Neill while I was in Illinois dusting asparagus. He made me feel like a movie star—probably because he was the first fan I'd ever had. Each morning at daybreak, about 5:30 a.m., I'd find Joe parked down at the end of the runway, waiting for me to take-off for my day's dusting operations. The first couple of days he worried me—I thought maybe he was a farmer out gunning for me 'cause some of the arsenic lead I dust with had killed a cow of his, or some other farm animal. But one afternoon when I was repairing some cuts in the fabric of my ship, Joe

PIPER CUB is good crop-dusting plane for small field work. Advantages of using a *Cub* are its low operating expense and its flexibility. Disadvantage might be its small pay load, but even 200 pounds will dust 10 acres

came meandering up . . . and the truth was out.

It seems that Joe was a farmer from the neighborhood, had a commercial pilot's license and a hankering to do crop dusting. When he first asked me about it, I tried to get him to go to a crop dusting school over at Galesburg, Illinois, but Joe reported he didn't have time for that. Then he offered to pay me for some instruction and added that he could borrow a friend's Stearman. I agree to do what I could—and that's how it all started.

The next afternoon when I came back from lunch Joe had his Stearman sitting alongside mine on the line.

"Well, you ready to go, Hap?"*

I could see the fellow was all excited.

**(Not to be confused with General "Hap" Arnold)*

"Yes, any time you are, Joe."

"We can go over to my farm and practice on our field."

"Wait a minute," I put in, "we don't do any of that kind of practice yet; today we go up in the stratosphere, 500 feet that is, and see what kind of a pilot you are before we try any of this 'low altitude' stuff."

The first day we just flew around. I had Joe do some turns and stalls and other basic flying maneuvers, with the main emphasis on stalls. Joe turned out to be a very smooth and well-coordinated pilot, a natural to make a crop duster.

After we got back to the field Joe said to me: "In the morning when you're traveling from one field to another, I notice that you never fly over 50 feet. Why do you do that?"

"There's many reasons for that," I replied. "One is to save time, another to get used to flying near the ground, and—the most important—down there

HOPPER installed in the *Cub* requires no structural alterations and can be removed at end of dusting season

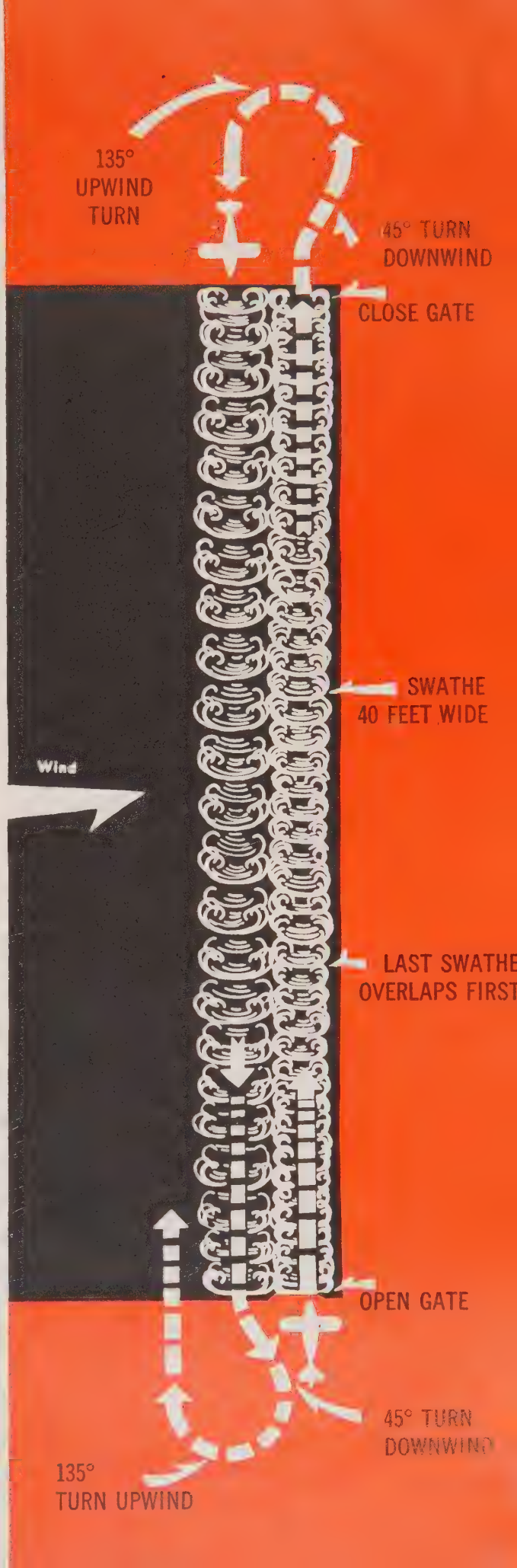
you can see obstacles very clearly."

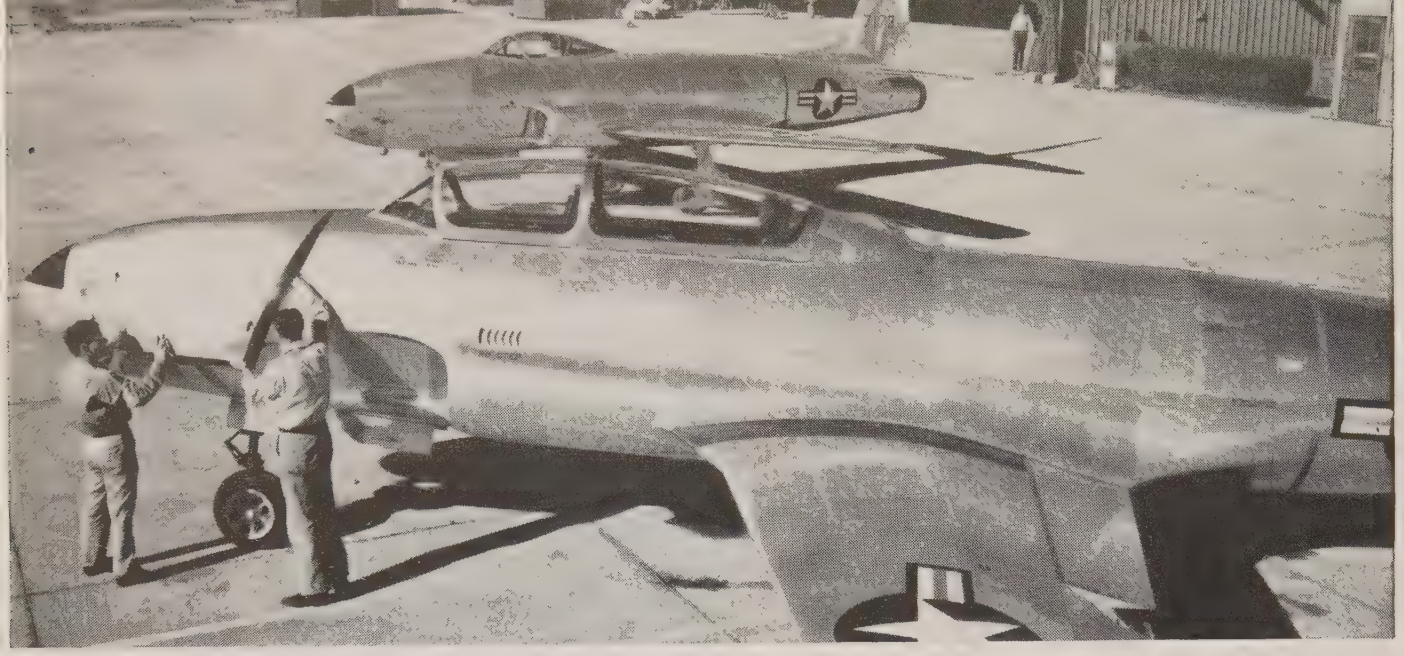
"After making a swathe across the field I notice you always make a 45° turn down-wind. Is that the general procedure?"

"Yes," I answered, "it's best to make a 45° turn down-wind, that gets you away from the field. Then you make your 135° turn up-wind. Timed right, you can roll out and be lined up with the last swathe and you're ready to make another run in the other direction."

"Why not make your 45° turn into the wind?"

"Well, by making your first turn down-wind," I explained, "it takes you away from the field much faster, and your next turn, into the wind, is much shorter and lines you up much better with the field. If you made your first turn into the wind and your second turn down-wind, you would over-shoot your field." *(Continued on Page 45)*



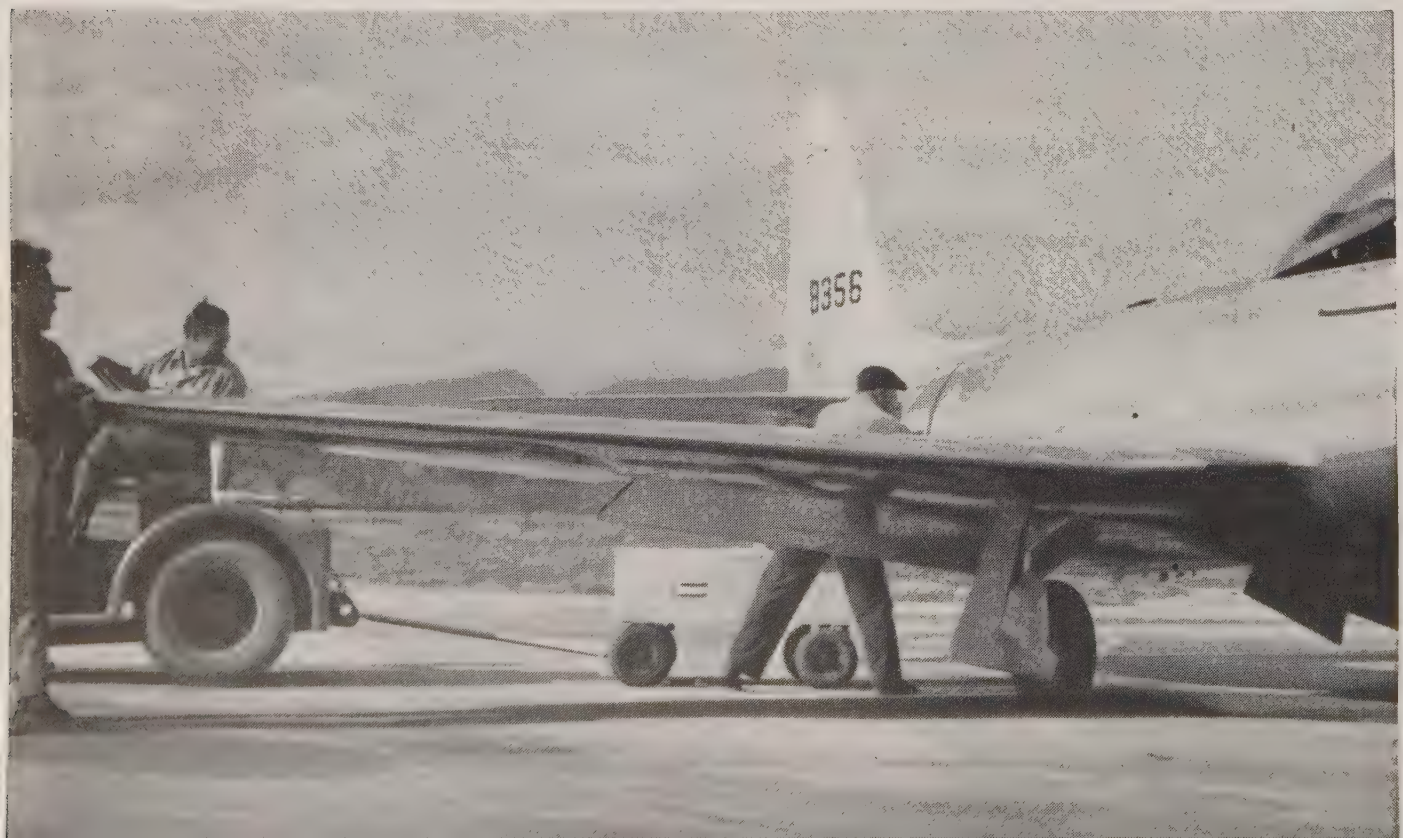


CANOPY differences between TF-80C *(in foreground)* and the standard P-80 *(background)* are clearly shown in this photo

FIRST JET TRAINER

A VERY important "something new" has been added to the Air Force by Lockheed Aircraft, and this "something new" is a two-place jet trainer to help speed the training of both aviation cadets and seasoned veterans in the operation of the new jet tactical aircraft that are being delivered to the Air Force units.

According to Lt. Col. Edward Herbes, Director of Training at Williams Air Force Base, the new jet trainers will save time and also 10 to 15 per cent of the present cost of training each pilot. One entire step in normal fighter training probably will be eliminated. Student pilots will be put into the jet trainer immediately following their basic flying in prop-driven ships, and there won't be that period of transition flying in high-performance conven-

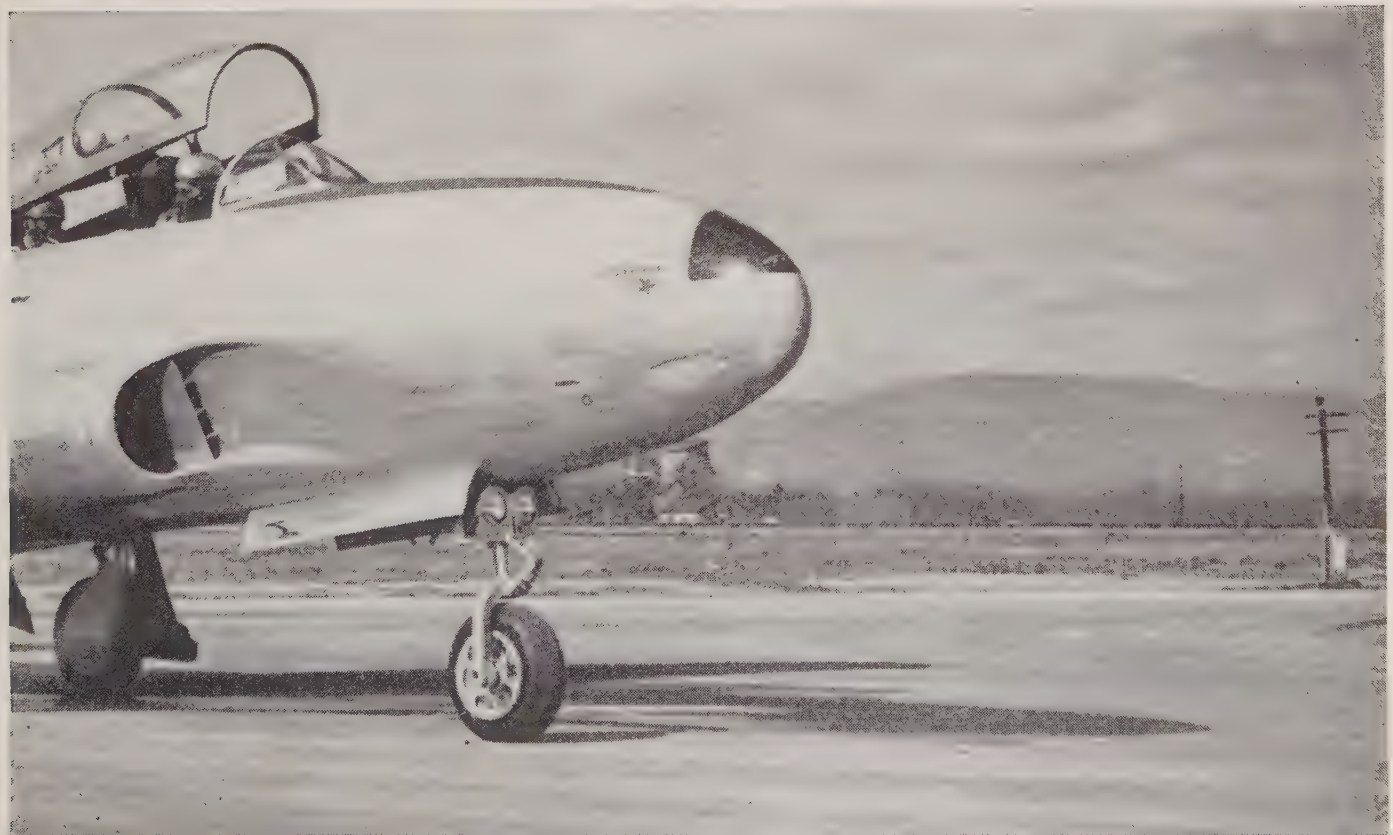


TEST PILOT LeVier in front seat and Engineer Gaiser in rear seat show the "instructor-student" arrangement

tional planes. With this new jet trainer, an experienced jet pilot can give new men not only thorough flight instruction but also drill in combat maneuvers, aerial gunnery, formation flying, high-speed navigation, etc.

The only difference between the standard P-80B jet fighter and the two-place TF-80C jet trainer is that the cockpit has been enlarged, a new canopy designed and a larger air conditioning and refrigerating system installed. The fuselage of the TF-80C is three feet longer than that of the standard P-80. The jet engine used is the Allison Model 400, the same that is used to power the latest models of the P-80 now in tactical operation with the U. S. Air Force units.

DEVELOPMENT of this first jet trainer will speed up training time of pilots for USAF's new jet air force. Students will go from basic training to jet via TF-80C trainer, and then be assigned to tactical jet squadrons



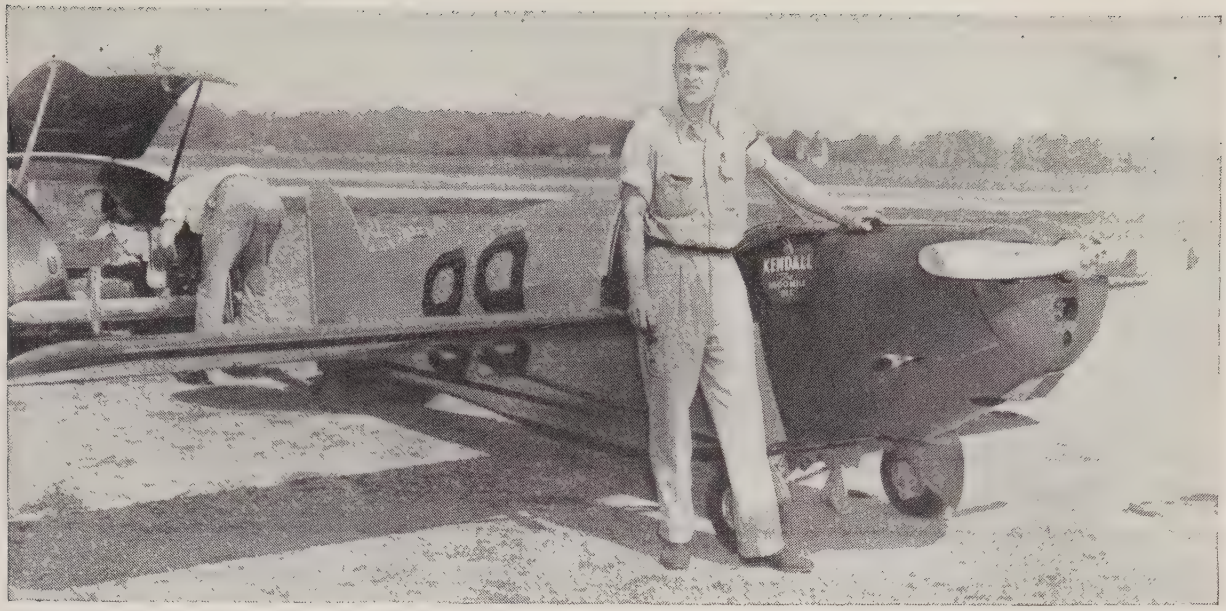
AERONCA C-3 was a popular lightplane back in 1931. A two-seater, it was powered by 36-hp engine, had a top speed of 80 mph and a range of 200 miles. C-2 version of same year was single-seater powered by 30-hp engine

Short on hp . . . Long on fun

By C. B. COLBY

KLEMM-DAIMLER, built in Germany, was a two-seater powered by 20-hp engine. Performance was good

DRIGGS DART, built in early 1928, was two-place ship powered by 35-hp Anzani engine. It had a top speed of 85 mph and a range of 250 miles. This small and easy-to-handle sport plane had a gas capacity of 4 gallons



TODAY'S midget planes, like this one that is modification of ship built by Art Chester, are a step in the direction of flying for fun. These hand-built midget ships do more on 85-hp than most airplanes do on a 125-hp

EVERY so often the American public outsmarts itself and then wonders what has happened. The reason for this is a sort of chronic dissatisfaction with whatever we have at the present.

The modern light airplane for personal use and sport flying as a beautiful example of this "outsmarting," with the result that right now the private flying fraternity is in a spot. Both the would-be private flyer and the lightplane manufacturers are today staggering through a pretty dark era.

The reason for this sad state of affairs is the cost of flying for fun, the reason for the majority of layman flying. The airplanes cost too much for the average chap to buy one for mere sport of flying, the rental of airplanes is too high for the citizen who wants to fly around for a couple of hours on a weekend just to keep his hand in, or just for the heck of it, and it costs too much to build aircraft to: 1)—lower the purchase price and, 2)—reduce the rental rates and still break even over a year.

The sum total of the facts is practically "no sale" for the models we have produced.

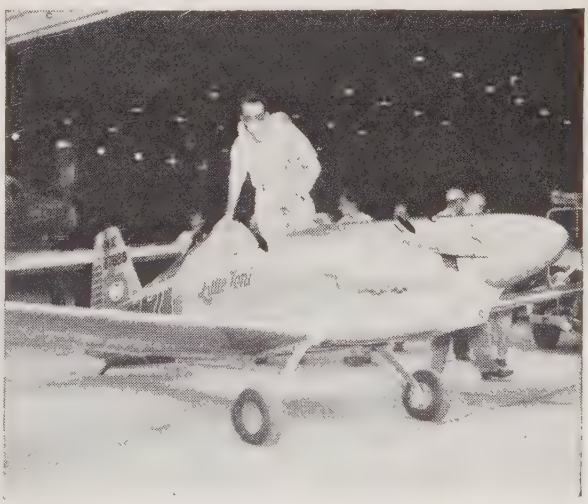
Let's look at the picture and see why the airplane for the average guy costs so much and why we seem to have missed a boat somewhere along the line in our search for a truly inexpensive *light* aircraft that would be ideal for the average pilot to fly for *fun*.

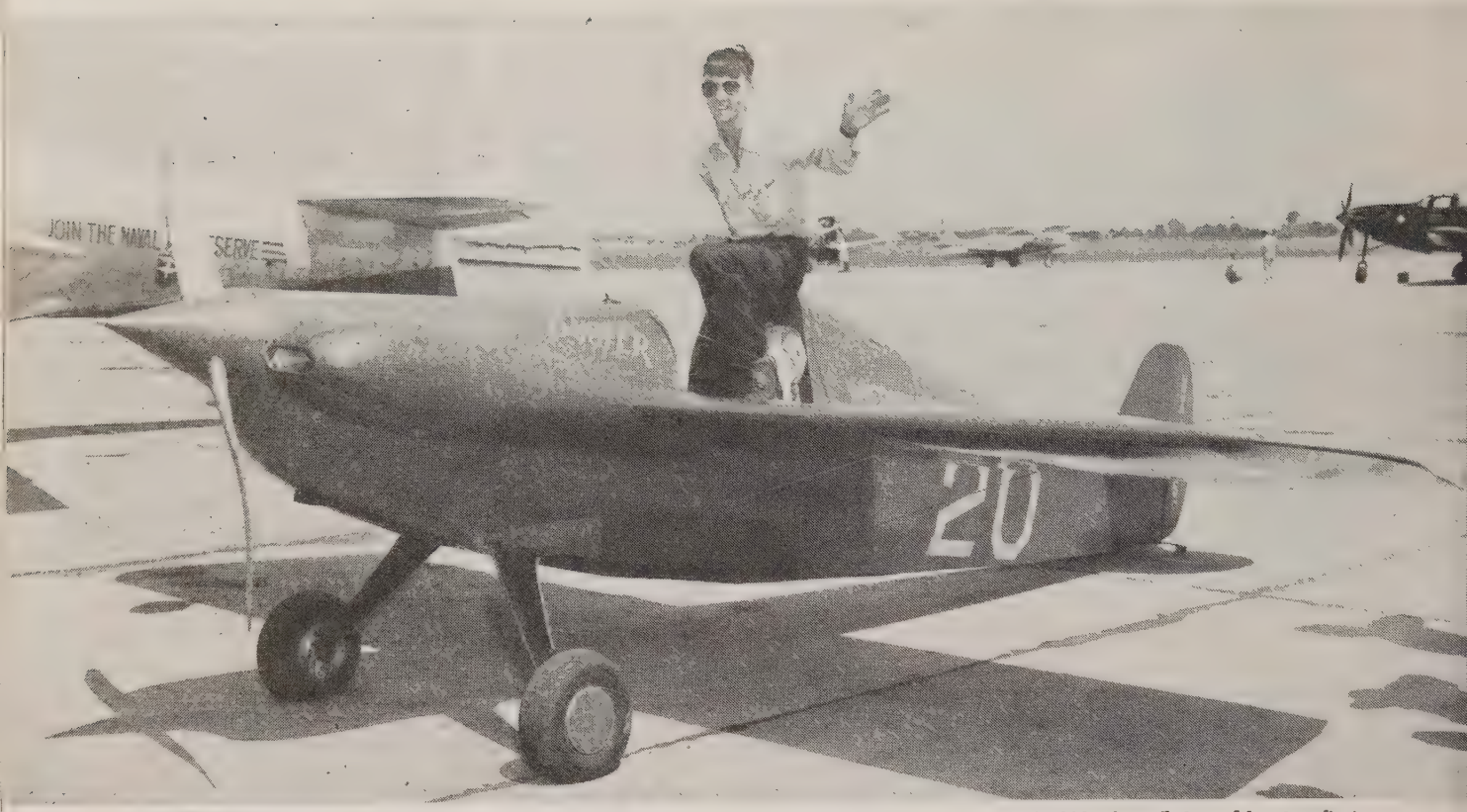
I've just been thumbing through my old battered copy of "Janes Aircraft" for 1919, right after World War I, and I think I have found where we outsmarted ourselves. After that first of the many "wars to end wars," we had a similar situation to that which we have today . . . a lot of war-trained pilots who still want to fly, but with nothing to fly *in*. Nothing that they can really afford, that is.

Back after that war several aircraft manufacturers had an idea as to what to do and tried to follow through on it. They failed because they did not have the modern equipment and technical "know-how" that we have today . . . and possibly enough backing to *keep* going . . . but they *did* have the idea.

They planned to build some truly light aircraft for the average pilot who wanted to fly for fun, and they built some. The fact that they could not keep on building them and so sell the idea of low-powered sport flying to the general flying public was the trouble. If we had kept on with the idea of keeping a lightplane *light* we might today have

ACE RACER Tony LeVier built "Little Toni" for the Goodyear Race at Cleveland. Its engine was an 85-hp

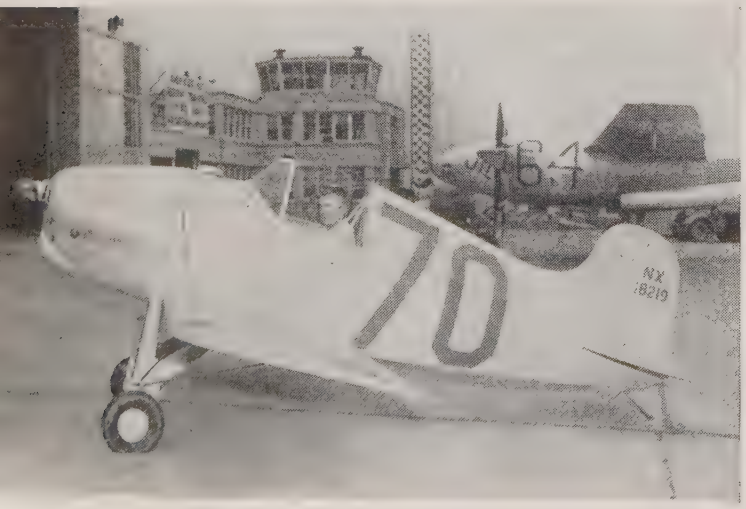




WINNER of 1947 Goodyear Race was Bill Brennand in his *Whitman Racer.* The race was limited to ships of 85-hp. Brennand won $7,000 for flying his to first place at an average speed around course of 165.8 mph

a very different picture of aviation in the United States. If we were to take a tip from those pioneers and once more design and build some really *lightplanes* we might still be able to make this the air-minded country we have been kidding ourselves into thinking it was. The modern manufacturer who junks his ideas of a personal sport plane and begins to build a light airplane will find a new market, and at the same time give sport flying a desperately needed shot of high octane in the empennage.

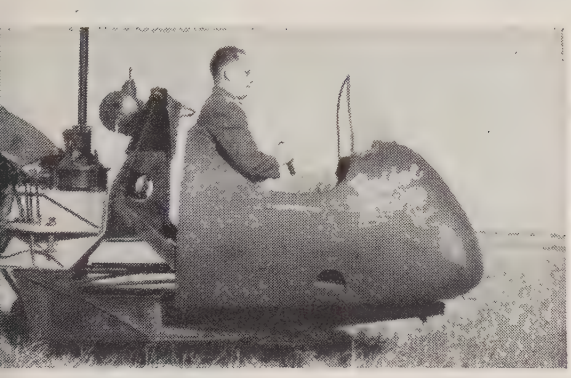
STUBBY but fleet racer owned by Flightways, Inc., was flown by Pilot C. W. Bing in the 1947 Goodyear Races



Listed in the 1919 "Janes" were two samples of what the manufacturers tried to produce with their limited means. There was the little Dayton-Wright *Messenger* with a four-cylinder 35-hp DePalmer engine. This single-seat plane weighed 635 pounds fully loaded, had a top speed of 85 mph and a landing speed of 37 mph. An even more amazing "sample" was the Joseph Bellanca single-seater. Both of these were biplanes. The Bellanca was powered with a three cylinder 35-hp engine and weighed 400 pounds. It carried 375 pounds of useful load. Its performance was something to make your eyes bulge: a top speed of 85 mph on 35 hp and a climb of 820 feet a minute. On 24 hp it could still do 76 mph and climb 530 feet a minute, and on a mere 18 hp it could fly 70 mph and still climb at 330 feet per minute. Its minimum speed was 34 mph and it took only 6 hp to keep it in level flight, once airborne. With a dead engine, it had a gliding angle of one foot down for every 11½ feet of forward glide. Sounds like a lot of fun to fly doesn't it?

Take the average 65-hp lightplane of today and let's see how it compares. It weighs about 700 pounds, carries 550 pounds of useful load, has an average speed of 90 mph and a landing speed of 38 mph. Its gliding angle is about 10 to one, and it climbs at about 450 feet per minute. In other words with twice the *(Continued on page 52)*

New 'Copter Idea



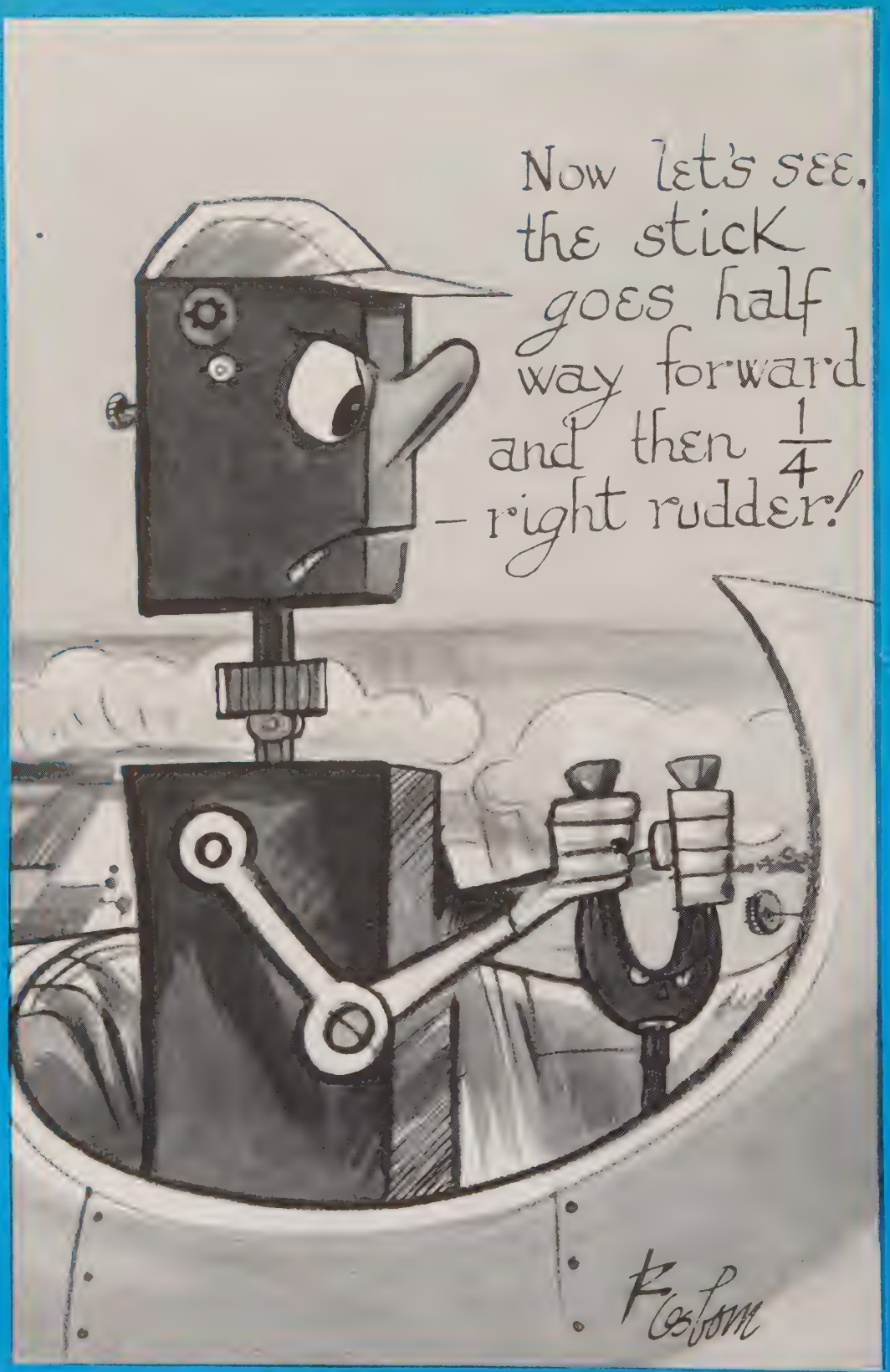
LOSE-UP of the forward section of Charles Seibel's licopter shows how its revolutionary system of control erates. With the stick in neutral position *(above)*, e movable cockpit section is in a neutral position

AERONAUTICAL Engineer Charles Seibel, of Wichita, Kansas, is another proof that sailors aren't the only ones guilty of taking so-called "busman's holidays." Working on his machine only in his spare time—and in his own basement at that—Mr. Seibel built a helicopter that's really different. Seibel's 'copter employs an entirely revolutionary system of control—the forward section shifts back and forth and sideways on a swivel track, and as the center of gravity is thus shifted (by stick action) the helicopter moves in that direction.

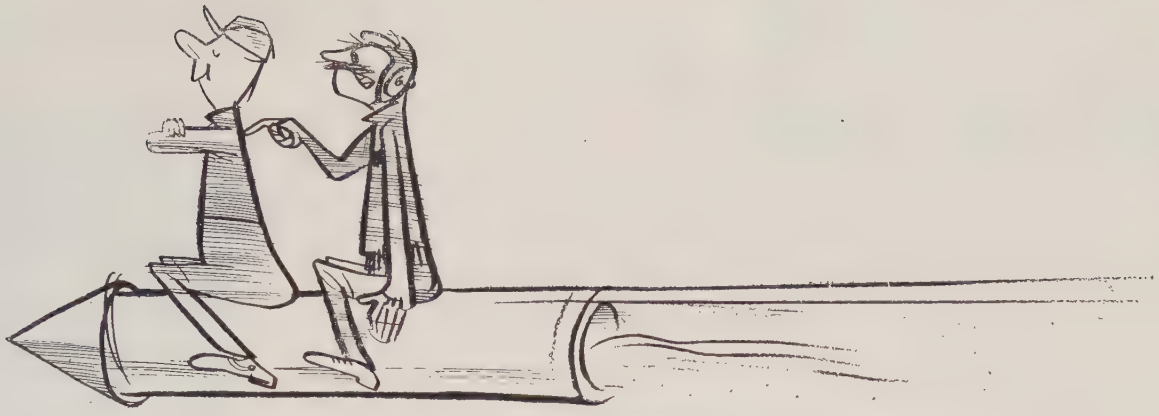
Mr. Seibel built his 'copter almost entirely of standard automobile and truck parts. A Ford clutch, for example, serves as the rotor transmission. To add another "unusual" to the story of this rotary wing aircraft, Mr. Seibel had never flown any type of aircraft prior to building his machine. In spite of this, however, Seibel stepped into his helicopter, turned up the 65-hp Franklin engine that powers it, and took off. That first flight was successful in more ways than one.

According to the builder's estimates, this 'copter has a forward speed of 90 mph, and a ceiling of about 13,000 feet. Empty weight is 540 pounds.

STICK pushed forward *(left)*, the cabin is moved way forward on its swivel mount. Thus, by shifting the cg (or moving the cabin), the helicopter moves in the desired direction. Designer Seibel is at controls *(below)*



Dilbert's flying is A Little Mechanical



DILBERT

By S. H. Warner and Robert C. Osborn

Taxi Dope—In the first place, Dilbert was taxiing too fast. Besides, he was careless. He ran way off the taxi strip and brought up with a crunch against an upright sign. He was ready to commit murder as he jumped from the plane and surveyed the broken wing. But he felt more like hara-kiri when he saw the sign he had hit. It read, "TAXI SLOWLY."

Approximately one-tenth of all aircraft accidents occur during taxiing. And the majority are just about as necessary as this one. The following "safe taxiing rules" would prevent most:

1. Taxi at a safe rate of speed; slowly enough to permit "S" turns for clear vision, with positive control at all times.

2. Never taxi into an area that has not been cleared visually. "Blind spots" are no excuse; the plane *must* be maneuvered so that these spots never blank out an area into which the plane is taxiing.

3. Never taxi too closely behind another plane. Allow plenty of distance so that you can stop without a collision or nose-up, should the plane ahead stop suddenly or unexpectedly.

4. Never allow your attention to be concentrated in only one direction while taxiing; maintain a sharp lookout in all directions. Adjust your seat to give maximum visibility, but be sure you have full throw of rudder and brake pedals.

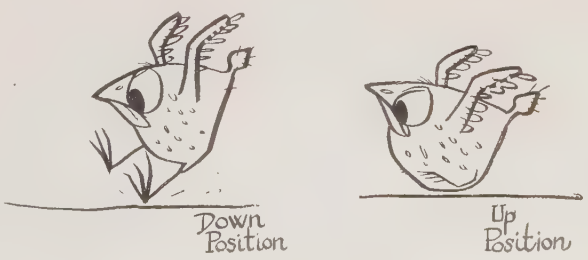
5. After a landing run-out, make certain the area ahead is clear before adding throttle to clear the runway.

6. Establish and maintain radio contact with the tower for all taxiing. Army-Navy-CAA "Standard Airport Traffic Control Procedures" requires this and makes the pilot responsible for requesting taxi instructions before leaving the line. The tower can do a great deal toward preventing ground accidents if contact is maintained and good procedure is followed by tower and pilot.

7. If your plane stalls on the field, take immediate precautionary measures. Notify the tower and look out for collisions. Don't sit there and get chewed up. Get out and try to warn away other planes, using your drawers, if necessary.

8. Be especially careful at night. Visibility is reduced, so taxi slower than usual. Be sure running lights are functioning. And make certain that you know the field lighting system.

9. Use brakes intelli- *(Continued on page 50)*



CAOA REPORT . . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminatory legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary, to bring about improvements in aircraft, equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

THE Corporation Aircraft Owners Association, now numbering 21 member corporations, presents an imposing list of aircraft owned and operated by its members. Numbering 46 planes in all, these aircraft include one four-engine ship, 32 twin-engine and 13 single-engine planes. Used mainly in the transport of executive personnel on business flights throughout the country, these ships are expertly flown by professional pilots. Each ship averages more than 50 flying hours per month.

All of the CAOA members' multi-engine aircraft are equipped and instrumented for flights under Instrument and Night conditions, and all of these ships are operated under those conditions when necessary. While many of the members' single-engine ships are equipped for instrument and night flying, few of them are operated under such conditions.

CAOA Aircraft . . .

Operator of the greatest number of company-owned executive ships is the Goodyear Tire & Rubber Company of Akron, Ohio. The Goodyear hangar includes one Lockheed *Lodestar,* two twin-Beech, one Model 17 Beechcraft and one Beech *Bonanza,* one Waco Model "E", two Stinson *Voyagers,* and Fairchild Model 24, two Aeronca *Champions,* one Piper *Cub* and a *Super Cruiser,* and one Cessna 140.

The Sinclair Refining Company operates two Lockheed *Lodestars* and three twin-Beech, while the Hanes Hosiery Mill Company, Bristol-Myers Corporation, the A. Buchanan Drilling Company, Armco Steel Corporation, L. B. Smith, Inc., United Cigar-Whelan and Wolfe Industries each own and operate a twin-Beech.

General Electric Company of Schenectady, N. Y., owns and operates a Lockheed *Lodestar,* and the Champion Paper & Fibre Company, of Hamilton, Ohio, operates a twin-Beech as well as a Grumman *Widgeon.*

Burlington Mills Corporation, of Greensboro, N. C., and Atlantic Aviation Corporation, of Teterboro, N. J., each operate two twin-Beechcrafts.

Corning Glass Works, Corning, N. Y., has one twin-Beech and a Douglas B-23, while the B. F. Goodrich Company, of Akron, Ohio, has both a Lockheed *Lodestar* and a twin-Beech for executive business flights. Reynolds Metals Company and Republic Steel Corporation each have two twin-engine executive ships. The Reynolds Company operates a twin-Beech and a Douglas DC-3, while Republic Steel flies two Lockheed 18's.

National Dairy Products Corporation operates a DC-3 as does Grand Central Airport Co., of Glendale, California. The Howes Leather Company, Inc., of Boston, owns a Grumman *Mallard,* and Consolidated Vultee Aircraft Corporation (New York office) operates a four-engined B-24-type ship, plus a Convair Stinson *Flying Station Wagon.*

Only three of the companies and corporations listed here are classified as CAOA Associate members—"any corporation, company, partnership, institution or individual owning or operating aircraft as an aid to the conduct of its business, which business is primarily in the aviation or air transportation field." All the others are CAOA Regular members — "any corporation, company, partnership, institution or individual owning or operating aircraft as an aid to the conduct of its business, which business is *not* primarily in the field of aviation."

CAOA Technical Committee

A special committee has been appointed by the Corporation Aircraft Owners Association to handle technical problems relating to the operation of aircraft, equipment, etc., of CAOA members. Members of this committee are:

Paul C. Craig, of Champion Paper & Fibre Company,

John R. Dunham, of United Cigar-Whelan Company, and

Walter C. Pague, Armco Steel Corporation.

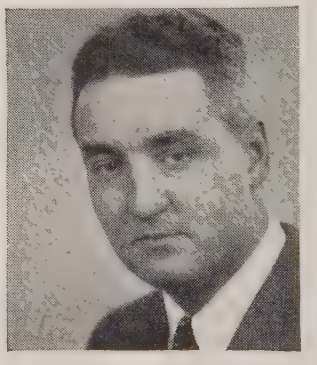
The committee's aim is to bring about improvements in aircraft equipment and service through joint cooperative action among owners. This cooperative action will result in constructive suggestions to manufacturers, distributors and service agencies, and will further the cause of safety and economy in the operation of CAOA aircraft.

To bring about an interchange of ideas for the benefit of CAOA members in the operation of corporate aircraft, the Technical Committee conducts surveys with reference to aircraft equipment, operational problems, insurance, etc., and the results of these studies are given to member corporations of CAOA.

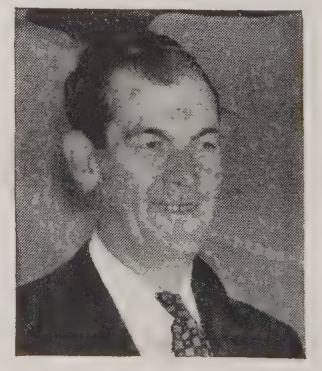
From time to time the Technical Committee will test certain items of equipment of particular interest to the operators of corporate aircraft, and will report on those tests to the members of CAOA. In this way, members of the Corporation Aircraft Owners Association will be kept abreast of developments within the field of aviation.

TECHNICAL COMMITTEE

WALTER C. PAGUE, Chief Pilot for Armco Steel Corporation, served with Naval Air Transport Service during the war. He has 6500 hours of flying, holds an Airline Transport Rating, is Lieut. in the USNR.



JOHN R. DUNHAM, Chief Pilot for United Cigar-Whelan Stores Corp., served with the Air Forces during the war as an instructor and later as Squadron Commander of 397th Bomb Sq. He is Lt. Col. in AFR.



PAUL C. CRAIG, Chief Pilot for Champion Paper & Fibre Company, was a Navy pilot during World War II. He spent last eight months of war as Safety Officer for a squadron of over 600 Navy pilots.

Castered Gear

(Continued from page 21)

tional situation remains uncertain. Yet they want the benefits of air transportation and their economic growth may well be limited by its lack.

Most revolutionary advances are simple ones — and the crosswind gear is both revolutionary and simple. It has so many possibilities for advancing aviation progress that one is inclined to be cautious in estimating them.

From the standpoint of safety alone, the gear should cut the accident rate sharply, since a large proportion of all accidents happen during taxiing, take-offs or landings. The DC-4, which crashed at La Guardia Field in 1947, because it was caught in a heavy cross-runway gust during take-off, would have gotten off safely, in all probability, if it had been equipped with the adjustable gear. The CAB Safety Bureau files are full of similar incidents.

Since utility is the end towards which all aircraft manufacturers are working, the gear will provide so many simplications of flying that air travel should become available to thousands who otherwise would never be able to afford it. Low-cost, close-in airports will mean better competitive conditions for regional carriers and consequently, lowered fares. The white hope of the lightplane companies these days is in the executive aircraft and there is an almost unlimited market in sales to business and industrial organizations if they find they will be able to send their salesmen and executives by air into practically any territory they wish to cover. The saving in time for busy officials will make the cost of operation negligible. At present, the two principle deterrents to the purchase of executive planes are lack of close-in airports and weather. The all-weather traffic control system now under development by the Federal government will make flying possible better than 90 per cent of the year — almost as much as can be said for the usefulness of the automobile. The crosswind gear can stimulate the building of the airports.

For the private flyer, there is the possibility of one-strip roadside landing fields and small airports located within hailing distance of home — and that means greatly increased usefulness of the personal plane.

That such statements are not mere flights of fancy are proved by the fact that lake-front strips already have been installed experimentally or are being considered by such cities as Chicago, Detroit, Cleveland and Milwaukee. Los Angeles is investigating the possibilities of a runway spanning the dry bed of the Los Angeles river in the very heart of the metropolitan area.

Colonel Robert M. Love, President of All American Aviation, which developed one type of crosswind gear under CAA contract, told this reporter, "All American, as a local service operator, faces its greatest problem in getting into the smaller cities. We have given airmail pick-up service to a considerable number of towns for some years now — places which were formerly denied air service of any type. But this is not enough. There should be service for passengers as well. But cities of 25,000 population and up simply cannot afford in most cases the terrific cost of close-in airports requiring three to four runways, 4,000 feet long or more. Either they must go far outside of town, where land is cheap and plentiful, or do without an airport at all.

"With the crosswind gear, they can put their money into land near the center of town, because they will need only one runway and that can be built in the most economical place, regardless of the direction of prevailing winds. To us, this is a definite step forward. Its accomplishment is probably several years ahead, but we have to plan for future development."

O. W. Loudenslager, engineer for the Goodyear Aircraft Corp., who developed the Goodyear-type gear, stated: "It will give a combination of safety and saving. On the basis of our experience with several different types and sizes of aircraft, I believe that the gear is adaptable to planes of *any* size."

Col. Love, however, believes that the gear would not be used on aircraft over 50,000 pounds in weight, since their approach is at a greater rate of speed and is not so much affected by the wind. For example, the DC-6 touches down at 90 mph. But on lightplanes and on transports such as the DC-3, the DC-9 (if it comes about), the Convair 240 and the Martin 202, there is a very definite safety factor in the adoption of crosswind gear.

(Continued on page 44)

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Learfone MAKES YOUR PLANE A FLYING OFFICE

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HERE'S HOW IT WORKS

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Write for further information.

*

GRAND RAPIDS, MICH.

*T.M. Reg. Appl. For.

Sky Ranch

(Continued from page 23)

us. Pivoting smartly on the caliche runway, the jeep guided us back to the tie-down area. We followed dutifully and set the parking brake between a twin-Beech and a sleek Bellanca.

"That one of the new Cessnas?" the lanky attendant asked as he set the chocks. We nodded. "Sure is pretty," he grinned. "Reckon we can hangar it later this afternoon. Gotta Quiet Birdmen meeting here today. Sure have been busy." Unlike most airport attendants, this fellow wore a jaunty Stetson, blue jeans and cowboy boots.

"Just tie her down," we suggested, "while we check our reservations. Can we get something to eat around here?"

"Sure thing! Right over there at the pilots' lounge," the tall attendant nodded, pointing to a glassed-in quonset structure. Although this elaborate building of rock and polished oak looks like something from a movie set, huge rope script letters reminded us it was part of the Flying L.

Like all private flyers who visit this unique dude ranch, we had many surprises in store. For when Col. Jack Lapham, Texaco board member and veteran flyer, set out to build a modern resort airpark, he didn't settle for a half-way job. The result is a "recreatonal package" for the plane owner and pilot that can well serve as a model for the nation.

Most impressive building on the airpark side is the pilots' lounge. You approach it over flagstone walks, cross a broad stone terrace, and open sliding glass panels to reach the main lounge. Here a polished dance floor is surrounded by attractive tables and ranch-style furniture. A huge slanted window of many-paneled glareproof glass, reaching from floor to ceiling, permits guests to watch airport activities while dining or dancing. An oversize wood-burning fireplace occupies the other end of the lounge.

Adjoining the lounge are the snack bar and kitchens, all under the supervision of Leonard Koll, one of the Southwest's finest chefs. Koll, who was formerly head chef for the White Plaza chain of hotels, has a complete hotel kitchen at his disposal. Beyond the kitchen are room-size refrigerated stockrooms and deep-freeze lockers, all provisioned by the Flying L's herds of prize beef. Koll is proud of the fact that all produce used in the kitchen is supplied by the Flying L ranch. Since Bandera is located in a dry county, only beer is served at the Flying L. Guests must bring in their own hard liquor and, since many do, night flying is strictly taboo at the airpark. Aerial show-offs and buzz boys also get prompt attention at this well-administrated airpark.

Just across the runway from the pilots' lounge is a beautifully landscaped swimming pool nestled among towering trees. Near the pool are 12 stone cabins, hidden from aerial view by these same huge trees. These cabins should more appropriately be called "guest houses," for each has a living room, central heating and a natural fireplace, two bedrooms with private baths, and two cool screened-in porches. To give you an idea, each of these rambling "cabins" cost a mere $25,000 to build. Cabin rates are $15 per day per person. This charge includes three meals, daily services of cowboys and guides, horseback riding, swimming, fishing, and all ranch sports.

For the private flyer who likes to "rough it," quarters are also available at the Flying L ranch house. This rambling two-story frame building is strictly Old West with no dude trimmings. It can accommodate 12 guests, has a second-floor screen porch, and a screened-in terrace on the ground floor. Chief attraction at the ranch house are the finest family-style meals served on any spread. An $8 per person daily rate covers board, room, and all ranch privileges.

After lunch, we took a quick trip around with airport manager Johnny Fielder and learned some interesting facts about the Flying L. For instance, before construction began on runways and buildings, an exact scale model was made. Engineers poured water in this model to determine direction of drainage and best sites for proposed buildings. Even all trees were accurately scaled on the tiny airpark, permitting architects to experimentally clear away trees at will for proper effect without marring real-life counterparts.

Airpark facilities include a trim little administration building of glass and stone, four individual hangars for twin-engine planes, and a 40 x 100-foot stone quonset hangar for smaller planes. As part of the airpark's "recreational package," flight instruction, rentals, and charter trips are available for ranch guests. "We teach many guests to fly while they're here," Fielder explained. "We can give them a private license—including the written examination—right here at the airpark." Lawrence Marcus, of the famous Neiman-Marcus specialty store, took his first lesson while attending a store-sponsored fashion show at the ranch. Returning to Dallas, young Marcus signed up for a flight course at Mustang Airport.

"We often fly guests to Laredo in a twin-Beech," Fielder added. "It's only 150 miles by air. Then we drive them across the border for shopping, dinner, or dancing." The ranch hopes to make one twin-Beech flight to Mexico each week during the coming season. A weekly fish fry is also on the program. Fielder is currently searching for an old-time covered wagon for use on moonlight hay rides. Covered wagon owners are invited to write but no wagons should be sent collect.

Our arrival was nicely timed, it turned out, for the Laphams gave a barbecue for visiting QB's that evening. We joined the fun and during the course of the evening quickly learned at least one group of "Quiet Birdmen" is laboring under a misnomer. There wasn't an introvert in the crowd when Col. and Mrs. Lapham took their guests to a Saturday night cowboy dance in nearby Bandera.

Here booted and blue-jeaned cow hands swung the local gals through "Cotton-Eyed Joe," "Put Your Little Foot," and other western dances. Needless to say, the guests quickly got in the swing of things. If you see a couple stepping off "Cotton-Eyed Joe" at the Stork or Ciro's, or hear a Kansas City debutante humming "Jole Blon" (Joe-lee Blaw) you'll know some far-flying pilot is to blame.

Early next morning we tumbled down the ranch house stairs to find steaming coffee, eggs, bacon, and king-size biscuits waiting

(Continued on page 49)

BRITISH FOUR-SEATER

Britain's newest in the four-place lightplane field is the Chrislea *Super-Ace*. Powered by a De Havilland 145-hp engine, the *Super-Ace* has a top speed of 128 mph, cruises at 115 mph, and has a cruising range of 400 miles. The ship is now in production.

The great new '48 Stinson. Cruising Speed: 130 m.p.h. Non-stop flying range, at 5,000 feet: 554 miles.

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"We needed a workhorse plane"

1. "We're now operating two Stinsons," says E. E. Jackson, general sales manager of a Texas oil refinery. "We needed real *workhorse* planes that could fly *anywhere,* and carry up to 12 cases of our oil on rush deliveries to customers—that's why we chose Stinsons."

2. "My flying salesmen keep both planes busy all the time," he adds. "Our customers appreciate the faster service we're giving."

3. "Our company officials often use one of the planes to visit our other four refineries. Our Stinsons certainly pay for themselves."

FREE FLIGHT INSTRUCTION

If you are a business or professional man interested in learning to fly, we invite you to inquire about your Stinson dealer's free flight instruction plan. Write W. H. Klenke, General Sales Manager, Stinson, Wayne, Michigan. No obligation.

Cessna "170"

(Continued from page 26)

Anyone who has ever flown a two-place Cessna will never have any trouble with the "170." All instruments, switches, valves and trim tabs are in the same old place. Actually, a pilot can easily think that he is back in the two-place model until he turns around and looks into the back seat. Visibility, however, is better in the droop-snooted "170" and there is no need to S-turn in taxiing.

As a proof of the striking similarity of models this reporter asked Mr. Frye to sit back and watch a check-out without making any comments. After having flown the "140," it was a cinch! The main difference in flight characteristics is in elevator control. Since the Cessna has always been known for finger-tip control in all departments, there has been a complete departure in the "170" by deliberately designing control-wheel pressure into the elevators. Mr. Frye pointed out the possibility of an inexperienced pilot putting high stresses on a plane by reefing back on the wheel too rapidly, and to make the novice pilot aware of his mistakes, the elevators were designed to load-up easily.

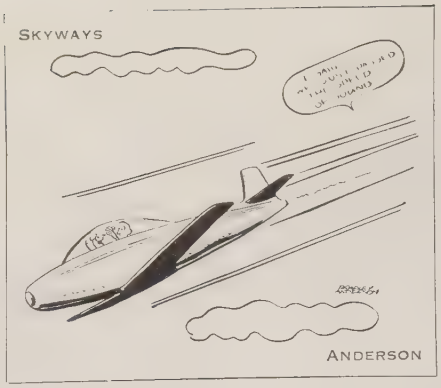
"It is completely a trim-tab airplane," explained our check pilot. "When you take off, you set your trim for a normal 85-mph climb. When you level off, you change trim for cruising. As you slow down in the traffic pattern, the trim tab comes back again. Then as you turn on your landing approach, you trim the plane back to about 60 mph and let it come on down with the normal finger-tip pressures.

This increased use of trim tab may seem a nuisance to some pilots, but the easily-reached trim wheel of the Cessna is located between the front seats and can be reached without the pilot ever taking his eyes off the airport. This system merely incorporates in a small airplane what airline pilots have been doing for years.

Our first flight was a liberal education. With the one-piece landing gear, the "170" tends to wallow when taxiing over rough ground—and the turf at the Cessna factory is just that, but the gear successfully snubs-down many of the shocks of the roller-coaster flight strip. We hit the tops of at least three young hills on take off, but the "170" didn't seem to mind a bit.

The best rate of climb is at 85 mph with full throttle on the 145-hp Continental engine. In a climb the tachometer showed 2300 rpm on the McCauley metal propeller. While Cessna is conducting tests on many of the variable-pitched propellers, they anticipate that results will follow those of the "140" and show that the fixed-pitch metal propeller gives the best all-around results. For high-altitude fields, however, a shorter take-off roll is anticipated with the more expensive controllable propeller.

We climbed up to 4,000 feet and tried some steep turns. At first the little skid-ball on the bank-and-turn showed a definite tendency to skate up to the high side on all turns. Rudders are quite sensitive. After a few tries, we were able to keep the instrument somewhere near normal. Wheel back-pressure in 45° turns is not as heavy as one might expect with this unique elevator design, but as



soon as the turn is steepened to the point where high loads are placed on the structure, control-column pressures quickly remind the pilot that he is loading-up his airplane.

Stalls in the "170" are similar to the smaller "140" except that the trim must be rolled back or uncomfortable wheel pressures occur. In a full stall, power off, the "170" gives all the warning in the world before it decides to quit flying. First it talks to you with a high-pitched whistle as the air speed drops into the high 50's. Then the control wheel begins to transmit the buffeting of the elevators and the whole plane shakes a little—but it is still flying. As the stall is finally reached, the nose falls straight ahead and the whistle, caused by the open cabin ventilators, suddenly ceases.

With full flaps, the stalls are the same except that the break is reached a little more quickly and the plane stalls-out more cleanly. The flaps on this airplane are another unusual feature in that they are small in area when compared with most flap-equipped planes. Many pilots have complained that they are not as effective as they could be designed.

"We've designed those flaps to keep the average pilot out of trouble," explained Mr. Frye. "We could have doubled the flap area, but we felt that the inexperienced pilot would get himself into less trouble if they were designed as they are. With this smaller flap, we still have good glide control but don't have so much area that a pilot would get into trouble should he carelessly release his flaps in a stalled position on a go-around landing."

"We can't very well stretch out our claims for air speed around this country," commented Mr. Frye as we sped across the green fields of central Kansas. "Each of these section roads is a mile apart so you can check the accuracy of the air speed instrument without trouble."

At the recommended power setting of 2450 rpm—the manufacturer says that's 63 per cent power—the air speed read 120 mph in level flight. The wind was negligible and we crossed the mile-apart section roads each 30 seconds.

We came back to the factory field and shot a couple of landings. Here again the "170" handled almost exactly like the "140." As we were leveling off for what should have been a three-point landing, Mr. Frye asked, "Do you want to see what happens when the flaps are jerked out from under you?"

We were about six feet in the air with power off and the control column most of the way back. The check pilot snapped the flap handle from full flaps to no flaps as fast as he could move the control. Many airplanes, especially heavy ships with high wing-loading, would have literally dropped into the runway. The "170" didn't. The wing and the front of the airplane kept right on flying and the plane changed altitude about 20 degrees. The tail dropped about three feet and we made a surprisingly good, Navy-style tail-wheel-first landing. There was no bad bounce and the one-piece gear absorbed most of the shock.

As we started our second take-off, Mr. Frye reached over and pulled the throttle closed.

"If you don't mind," he asked almost reticently, "try making the take-off with your heels on the floor. I'm almost sure that you are dragging the brakes with your toes. We have ¾-inch wooden spacers on the bottom of the rudder pedals of this experimental model to keep pilots from dragging the brakes unconsciously, but you are still doing it."

Perhaps it's because we are well over six feet tall and have proportionately big feet. Those No. 12's take up a lot of cockpit room—but the next take-off was faster.

During one of the half-dozen landings we made on the grass-covered sod field adjoining the factory, Mr. Frye stepped down hard on the right-hand toe-brakes; so hard, in fact, that the wheels locked and skidded on the hard dirt. There was no tendency for the tail to come up. As the ship decelerated, Mr. Frye let up on one brake and we did what might be termed a "controlled ground-loop." The wings stayed perfectly level and the tail stayed on the ground as we spun around and stopped.

As we turned into the Cessna field on our final landing, the tower advised, "Clear to land—wind calm."

A quick look at the factory smoke stack showed a black plume streaming lazily southward, but there was definitely a 5- to 7-mile breeze.

"Wichita Tower from 692. . . . Did you say calm?"

There was no immediate reply. Then Mr. Frye remarked casually, "That's calm for Wichita. It usually blows to beat the band around here."

"Wichita tower from 692. . . . Pardon me, I'm from out-of-state."

Perhaps it was cluttering up the airwaves, but the tower operator came back with a snappy, "that is Roger."

Incidentally, another change has been made in the transmitter microphone of the "170." It is mounted on a bracket directly beneath the throttle. Mr. Frye explained that, in a side-by-side airplane, the pilot flies with his left hand and has his right hand free for the throttle, trim tab, accessory switches and the microphone.

After this shake-down flight in the prototype model, Mr. Frye untied his personal demonstrator, a brand new ship just off the production line, and we shot a couple of landings to compare the finished product with the experimental version. In the production airplane, the cabin noise level is noticeably lower and conversation could be carried on in a normal tone of voice. The upholstery job is tops and the completed instrument

panel has a very professional appearance.

With the increasing use of personal planes at night, due to better airport lighting facilities, more radio aids and better aircraft lighting, we asked Mr. Frye to fly the "170" at night.

The night was balmy, clear and moonlit —a nice night for love. The "170" was a gal with whom a pilot could fall in love.

The cabin dome-light is available as soon as the master switch is turned on and the pilot can easily see to make his pre-flight checks. On the organ-type control panel, the up-down switches, reading from left to right, are the master switch, turn-and-bank switch, then the throttle, navigation lights, left-hand and right-hand landing light switches. On this particular airplane there was only one Grimes landing light so the far right switch was a dummy. In night flight so much must be done by touch alone that the correct sequence of these switches should be memorized.

We started the "170," called the tower and taxied down the paved ramp to the airline terminal. There were four people in the plane. The adequate runway markers made it unnecessary to use the landing light for taxiing. After a quick run-up, we headed down the runway and the "170" climbed up into the milk-and-honey blackness off the end of the field. We leveled off at 3,000 feet and circled the maze of technicolor lights that were Wichita. Far out on the horizon, dotted lines of automobile lights converged on Wichita like the spokes of a huge wheel. There wasn't a bump in the sky and the "170" trimmed off beautifully. We made a number of hands-off turns, using rudder alone to roll the plane slowly in and out of the circles.

There is plenty of light around the Wichita field at night. Bright orange neon approach lights plus a too-bright green end-of-the-runway marker make the broad concrete strip easier to spot at night than in daylight. We shot one three-point landing with the aid of the landing light and then decided to go around again and try one without the landing light. In the dark of the cockpit, it was an easy matter to reach over and hit the retracting switch for the left landing light, but it was almost as easy to miss that switch by one and turn off the navigation light instead. When the landing light still glowed as we pulled up off the field, there was one mildly confused pilot aboard. Mr. Frye finally leaned over and pointed out the error of our ways. An error of this type would never happen to a pilot who was fully familiar with the "170," but it could be easily overcome, too, by placing those two switches farther apart.

After another landing, we reluctantly taxied the "170" back to the Cessna line, cut the switches and tied the plane down. It had been fun.

The next morning there was a tour through the busy factory, now producing a total of nine planes a day. Here was proved the wisdom of the high percentage of interchangeable parts as huge hydraulic presses stamped out ribs for the "140" and the "170," and many of the sub-assembly parts came out of the same jigs.

"There isn't a 'blind hole' (one that is drilled without a jig) in the whole airplane," said our guide. "That's why our replacement parts all fit perfectly."

In an article of this type, it is common practice to suggest a number of changes that might improve a new plane, but this ship is so thoroughly thought out that constructive criticism is tough. However, one small item on the instrument panel might well be changed. The mixture control push-pull button, complete with idle cut-off, is just one knob removed from the carburetor heat control. Actually, one would have to reach deliberately behind the left wheel to get to the mixture control, but it is conceivable that such an error might occur and cause a forced landing if the pilot became flustered. It would be simple to move these controls farther apart, substituting the cabin heat for the carburetor heat button.

There are no clips to keep the safety belts off the floor and the front belts frequently fall into the door opening as the pilot climbs into the "170." Then he can't shut the door until he reels in his belt.

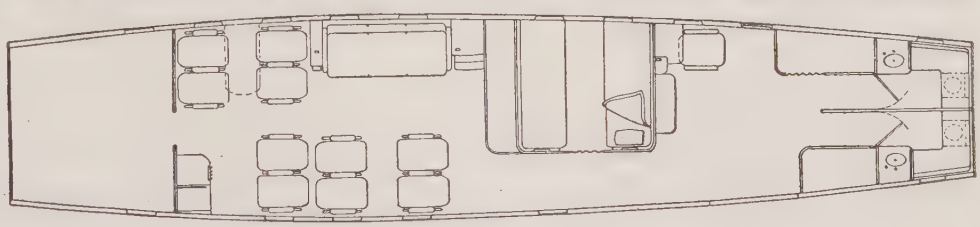
An assist handle or hand-hold would make climbing into the cabin easier.

Arm rests might help relieve fatigue on long flights.

All in all, however, the "170" is as near a complete airplane as any pilot could request. Time and aircraft sales reports will tell the final story of the newest in this family of Cessna airplanes. Even for the casual visitor, the first impression of the "170" is truly a "plush job" for four.

IMMEDIATE DELIVERY ★ Nearly New C46E (NC 30017)

Latest Model Long Range



Has had 31 hours delivery and test flights plus 143 hours of flight after NC.

Sound-proofed throughout with mica inside of skin, 2½ inches of fiberglass, one layer of Consoweld and one inch of fiberglas.

As presently equipped, has forward bulkhead, ten seats, buffet, locker, clothes rack, luggage space, rear bulkhead, lavatory, toilet and couch. Interior could readily be further refined for executive interior as shown in sketch at right. As now equipped can be used for passengers or combination passengers and cargo.

This airplane was third to last built by Curtiss-Wright at their St. Louis plant. Cruising speed, 50% of power at 5000 feet, 210 mph. Empty weight, 29,336 lbs.; as now equipped, 30,859 lbs.; allowable gross, 45,000 lbs. Gasoline capacity, 1400 gallons in six welded wing tanks outboard of nacelles. Complete factory equipment for de-icing. Two 100,000 BTU and one 50,000 BTU Janitrol heaters. Tension diaphragm fuselage design. Large luggage compartment below floor placarded for 1750 lbs. C.A.A. approved conversion data for luxurious executive modification available to buyer.

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Castered Gear

(Continued from page 39)

Pilots do not have to be checked out in flying with the crosswind gear, since the plane adjusts automatically on making contact with the ground. They do, however, need to spend some time in getting used to its characteristics in taxiing, since there is a somewhat "gelatinous" sensation involved —something like riding on ball bearings.

John H. Geisse, formerly Assistant to the Administrator of CAA for Personal Flying Development, who fathered the project and now acts as a consultant, and Lloyd Child, the new Assistant Administrator, have both approved the gear and have pointed out that it requires less skill of the pilot and eliminates the possibility of ground looping. With its use, last-minute pilot judgments in the split-second between approach to landing and actually striking the runway are unnecessary. The pilot merely "crabs" into the wind sufficiently to counteract its drifting force and instead of straightening up just before touching down, risking a ground loop, he merely lands in the crabbed position. The wheels are free to follow the forces of inertia exerted by the landing and they caster in line with the motion directly down the runway heading. Normal wheels would remain fixed in line with the longitudinal axis of the airplane.

From the passenger standpoint, there is no sensation at all from these seemingly "cock-eyed" landings. To the spectator, the plane may look as if it were going crazy but inside the ship everything feels entirely normal.

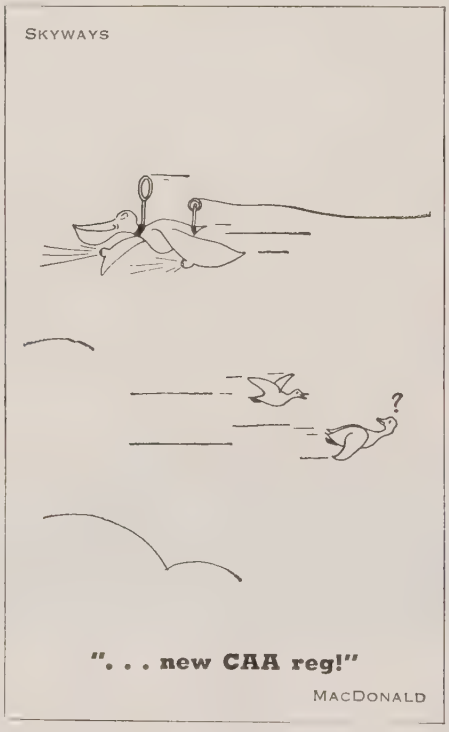
Under the CAA contracts, three types of gear have been developed. The first was built on a Fairchild trainer, using an external shock absorbing strut. It prevented shimmy but was not clean aerodynamically. The second is the Goodyear device, designed entirely within the wheel; and the third, the All American project, which leaves the wheel and frame identical, since the whole mechanism is contained within the wheel strut.

The advantage of the wheel mechanism is that it is interchangeable among different types of planes; its disadvantage (and also of the one designed in the strut) is that the movement of the wheel is governed by its mounting and the castering radius is not so great. In the case of the shock-absorbing strut, this would have to be redesigned for each type of strut, but it is simpler since most gears are now retractable and the wheels and struts do not have to be changed.

Col. Love, in describing the testing of the All American device, said: "We did our most extreme tests on what I call a 'Northwest day'—a front had just passed and we were getting sharp gusts up to 38 mph across the runway. In one of the tests, we really exceeded the normal attitude of the plane, but instead of turning off the runway and drifting, the 30-degree limits of the castering permitted the airplane to move but the wheels to remain along the regular track on the runway. The installation of this gear only takes about three hours. We aren't going to produce them, since we're an airline and an engineering and research organization. On these open contracts, the CAA can send us any ship it wishes to and we'll do the development. Or they can find bugs after 50 or 60 hours of testing and ask for changes on a model. We've been working on the *Ercoupe* and only have a clean-up job to do on that. Our principle work has been on the twin-engine Beechcraft."

Goodyear Aircraft has done a most elaborate job of research and development and has already gone into production on castered wheels. New Stinson and Cessna models are now on the market, with the wheels as optional equipment at an additional cost of $340.00. A change-over kit for planes already in use may be had for $430.00. As production increases, these prices will be reduced in accordance with volume.

Goodyear's first work was with a Piper *Cub* (J-3)—its latest is the equipping of a DC-3, on which the additional net weight is only 35 pounds. It has been used successfully on an experimental tricycle-gear Aeronca and the Company states that they are satisfied it can be adapted to airplanes equipped with knee-type struts and on those using tricycle landing gears. The entire working mechanism is inside the hub of the wheel.



Said Engineer Loudenslager, "In order to obtain the desired pivot, we angled the kingpin on which the wheel pivots 30 degrees with the ground in such a manner that the point of intersection with the ground would be ahead of the tire point of contact. Surrounding the pin is a stationary compensating cam in the horizontal plane so arranged that it will raise the airplane slightly as the wheels pivot, thus providing necessary static stability.

"We avoided the use of hydraulic shimmy dampening because of the possibility of faulty maintenance or dirt in the hydraulic fluid which might cause failure. Violent shimmy of the main wheels could well cause a landing gear failure and a serious accident. It is much more serious than shimmy in a nose wheel of a tricycle gear, since you can pull the nose wheel off the ground, if necessary. We have completely avoided this difficulty by making use of the friction developed by the weight of the airplane resting on the cam to provide the necessary dampening. Since the crosswind gear was designed to enhance the safety of planes and take the guesswork out of crosswind take-offs and landings, it is essential that no shimmy develop. We are satisfied that this has been accomplished.

"With this wheel development, castering is 15 degrees to either side of center on the DC-3 and is up to 25 degrees on lighter planes. There is no clearance problem with struts. At the present time we are working on the adaptation of the Beech *Bonanza*.

"The notched cam in the wheel keeps the wheels straight at low taxi speeds and permits the pilot to roll back into the hangar normally. From a year's experience of flying the *Cub* on every type of field and under all weather conditions, we find it is almost impossible to ground loop. The plane can turn in a 360-degree circle but the wings remain level. Maintenance has been very low.

"The landing gear has to be stressed for the same loads as are normal under existing CAA regulations but the wheels do not need any beefing up on any of the types tried so far. Our test pilot, Art Chapman, has flown this gear more than any other pilot in the country and has not encountered anything out of the ordinary. The average pilot only needs to become acquainted with it through taxiing until he gets the feel.

"We believe that it will save money for fixed-base operators, because they will be able to keep their ships flying more. We don't, of course, recommend that students fly in heavy winds but any pilot will be much safer if a wind suddenly develops."

The CAA Cross-Wind Landing Gear Project was officially contracted in fiscal 1946, after Congress had appropriated $150,000 for its development. Several years of research and preparation of planes has preceded the appropriation. Fairchild accepted the first contract for experiments with its primary trainer in January, 1946. Goodyear went to work on the *Cub* the following May. After the beginning of fiscal 1947, further contracts were let to Bellanca for adaptation to the *Cruisair;* to All American for the Beechcraft; to Firestone Aircraft for the *Ercoupe;* and again to Goodyear for the DC-3.

CAA is continuing operating tests on all the types which have been turned over to it by the companies and Approved Type Certificates are being issued as rapidly as these tests reach satisfactory conclusion. In addition to those already mentioned, CAA has purchased drawings and test results of gear designed by Northrop for its *Pioneer* transport. Goodyear has applied its design also to its own new amphibian.

In discussing the economic application of the use of the gear and its effects on airport planning, Mr. Child estimates that the adoption of single runway fields would reduce the total costs anywhere from 30 to 50 per cent, and that, aside from greatly increased safety to pilots and passengers, reduction in the number of landing accidents would materially lower flying costs to operators and owners.

Crop Dusting

(Continued from page 29)

Next afternoon I met Joe at the same place. We went over to his corn field. First we circled it to spot whatever obstacles there might be. This is law No. 1 in crop dusting. The field was 320 acres, approximately half a section, running north and south.

The wind was out of the west, approximately 15 mph. For actual dusting this would be too strong, but for practice it was a good condition because it would show Joe the effect of the down-wind and up-wind turns, and why he should make the down-wind turn in order to get away from the field.

With the wind out of the west and the field running north and south, I explained, we would start to lay our dust from north to south on the east side of the field. If we had started dusting on the west side of the field, by the time we'd turned around the wind would have blown the dust across our path on the way back. That, in the crop duster's book, makes for very hazardous flying.

At 50 feet we started our shallow dive, leveling off at above 5 feet above the crops. This is the place, at the very beginning of the field, where I made believe I was opening the gate to let the dust out.

I tried to emphasize here that the gate always should be opened slowly so as not to dump a lot of dust at the beginning.

We flew across the field, I closed the gate at the end, then pulled up. We did a shallow bank, 45° turn to the right which would be 45° True Course, then climbed for an instant on that heading. Then, at an altitude of about 50 feet, we did 135° level turn to the left which brought us back to our heading and ready to dust again north to south. We repeated the shallow dive, leveled off, opened the gate and laid this swathe directly alongside of the previous one.

The best way to lay the dust alongside of the previous one is to fly with the wing tip along the last swathe. We went back across the field and at the end shut off the dust as before and pulled up. This time, however, we made a turn to the left (45°, which would be 135° TC) and then made a right turn up-wind 135°, which would be north. This lined us up for our next pass.

After making several of these passes and turn-arounds, I let Joe try a few. At first he would over-shoot or under-shoot his mark, which is natural for any pilot who hasn't dusted before, but after practicing for an hour or so he had the timing down almost perfect.

Actually the turn-around procedure, insofar as the timing is concerned, is the same as a 180° overhead forced landing approach. All turns made at an altitude of 50 feet or below must be precision plus, meaning no nose up or down.

Back at the airport Joe and I went into some of the finer things that the pilot has to reckon with. For example, the flying characteristics of the airplane change after each trip across a field. On the first trip you have an 800-pound load, the next trip a 700-pound load, depending upon acreage covered. This loss of weight has to be taken into consideration. Wind conditions, too, have to be reckoned with. First time across the field, the wind is from the left; second time across it's from the right. Another thing to remember is that early in the morning is the most likely time for carburetor ice—so you have to keep the ears perked for it.

Joe and I practiced dusting maneuvers for several days. Then I let him get a little more familiar with my airplane. It's a little different because it has the 300-hp Lycoming engine and a constant-speed prop. I checked him out and let him fly around, not fully loaded but with a little bit of weight. I gradually increased the load until Joe was finally flying with a full load of 800 pounds. A Stearman with an 800-pound load flys about like a bomber with a full bomb load.

Next came some actual dusting. We loaded 400 pounds of lime into the ship and took it over to his farm. I let him practice dusting his corn. Lime at 50 cents per bag is cheaper for practicing than dust at 8 cents per pound.

With that Joe graduated and the last I heard of him he was dusting in Texas, and doing very well at it, too.

As far as the dust itself is concerned, all the pilot has to know is what insect or disease he is up against, so that he can obtain

(Continued on page 47)

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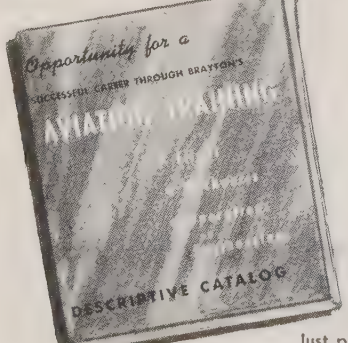

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Thunderjet

(Continued from page 16)

ifornia and Arizona and briefing on the 84's, some who had Air Force jet school training and many who were supposed to get on-the-job training.

Through a peculiar switch of circumstances, an especially picked jet unit with proven P-80's went to Alaska for operations in severe cold and for much of the time had only zero weather, much warmer than it required. The supposedly routine breaking-in operations of the 14th at Dow were conducted in temperatures that ranged down to 30 degrees *below* zero. It is a tribute to the men, the planes and the program they followed that in the 3,000 hours of flying they completed during the winter there were only three major accidents and no fatalities.

In a large sense, this is not a picked fighter group. While a list of its top officers reads like an ace honor roll of World War II, it also includes pilots called back from the reserves who never saw combat and some who are new graduates of the training schools. On its face, the 14th is a typical group, composed of the same mixture of age and experience that might be found in any other cross-section of the Air Force.

These are not the handsome, natty "fly-boys" of the recruiting posters, poured from a common artificial mold. A little older, a little more matured than their wartime counterparts, at least 90 per cent of the officers of the 37th, 48th and 49th Fighter Squadrons which make up the 14th Group, are married. They stick mostly to the home confines of Dow Field, partly because some aspects of Maine temperament discourage town-trotting, whether military or civilian. Neither war-like nor hard professionals, these pilots consider flying a serious business and they explore every aspect of it, both in their work and at odd moments in their after-hours relaxation.

On the other side of the picture, the airplane they fly has now proved itself after the hardest kind of testing any new military plane has ever had to face so early in its production life. The winter situation promoted many critical possibilities. If any of the men had been killed in the severe weather, the plane would have borne the brunt of the blame. Whispers and rumors might have condemned it throughout the entire Air Force as a "hot killer," a reputation that has had far-reaching effects in the past on other planes in causing pilots to become flight-shy. As far as the frankly speaking pilots of the 14th are concerned, the *Thunderjet* is "one of the sweetest flying planes we've ever been in."

A top Air Force officer is the source of an opinion that Col. Loring F. Stetson, Jr., experienced bantam-sized commander of the 14th, is the reason that the methodical, safety-conscious training program has succeeded as well as it has. Since no tactical group can be better than its entire leadership, the accolade applies equally to the way the officers and men of the group and squadrons have carried out their assigned precepts. As for the men responsible for designing and building the plane, when Alexander Kartveli, chief engineer of Republic Aviation, made a visit to the base to get "my first look at more than two P-84's in the air at one time," the men who fly the planes cheered him to the rafters.

The present complement of equipment at Dow Field includes both P-84's and P-47N's, wartime longe-range fighters also built by Republic. The *Thunderbolts* are used for instrument and navigation training, but as the new *Thunderjets* keep arriving from the factory they replace the older reciprocating engine fighters in service. When fully equipped, the group will have 83 of the jets. The present 600-mph model is powered by a General Electric-designed, Allison-built J-35 (TG-180) axial-flow turbojet delivering 4,000 pounds of thrust. Newer versions may be powered with the new General Electric TG-190, designed for 5,000 pounds thrust.

The *Thunderjet* is 36 feet 9 inches in length and has a wing span of 36 feet 5 inches. It weighs 13,400 pounds and has a service ceiling of 40,000 feet. Equipped with six M-3 .50-calibre machine guns, whose rated firepower is over 1,300 rounds per minute each, the P-84 is also designed to carry bombs and rockets under its wings, The mid-wing, tricycle-gear fighter has a tactical range of over 1,000 miles with wing-tip fuel tanks.

The winter and subsequent operations of the 14th Fighter group not only served to test the new fighter plane but also provided important lessons in operation to be fully utilized by two other new P-84 groups, one being formed at Roswell Air Force Base, New Mexico, and the other at Shaw Field, Sumter, South Carolina.

The training system for pilots inaugurated at Dow is intended for all classes of pilots, from those with experience in other jets down to the ones just coming out of flying schools. At least one of the new pilots in the group counts all his Air Force flying experience in time flown in AT-6's, P-51's and P-84's. All pilots in the 14th Fighter Group go through a transition stage where they have to read and pass a test on all publications concerning the *Thunderjet*. They also receive cockpit familiarization and blindfold tests. They must know the routine and emergency of every system in the plane. After a pre-flight check, they learn the starting and stopping procedures and then learn to taxi.

The first 12 flights are made according to the book with the pilot required to write a log of the operating performance of the plane from 5,000 up to 40,000 feet. Data to be recorded include airspeed, amount of fuel in the tanks (totalizer), tailpipe temperature, oil pressure, oil temperature, fuel pressure and other dial readings. When the pilot lands, he must also list fuel at the start of descent, time of landing, time engine stopped and amount of fuel remaining. The pilot must absorb for habitual action the fuel consumption characteristics of the plane because the voracious fuel appetite of a jet engine demands precision operation. When the fuel level gets down to emergency there is only time for one good pass at the runway before the "flame goes out." Every bit of flying from take-off to landing, is dependent on proper operation of the "flame" from fuel pumps to the variable exit tail pipe.

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Crop Dusting

(Continued from page 45)

the right chemical to counteract it. For tomato blight, for instance, a duster should get Try-Basic-Copper; for most beetles, use arsenic lead, and for corn bore use D.D.T. These are the most popular dusts, and may be obtained from the Farm Bureau Co-Op. or the Pittsburgh Plate Glass Co. They cost from 6 to 15 cents per pound, depending upon the chemical compound.

Most chemicals are mixed with talcum powder for carrier. The mixtures are 25 per cent chemical compound and 75 per cent talcum powder, and they may be purchased mixed or unmixed. It's a little cheaper to mix it yourself. If you are dusting for big concerns, they usually furnish their own dust.

As far as aircraft equipment goes, in my estimation the *Cub* J-3 makes a good airplane for dusting small fields. And it's a good ship for a seasonal duster who depends on one season in his locality. The great advantage in this type of equipment is its low operating expense and its flexibility. A disadvantage might be its small pay load, in the neighborhood of 200 pounds. But even this will dust from 5 to 10 acres, depending upon the crop.

The Whitaker portable hopper, made by Whitaker Hoppers, Inc., Portland, Oregon, is priced at $585.00 F.O.B., and is, in my estimation, the best hopper for the J-3. This hopper can be installed for around $65.00 with no structural changes required in the ship. At the end of the season it can be taken out and the airplane used for other purposes. Also it's a good idea, when building up the J-3 for dusting, to change the engine for a 75-hp one.

The Stearman is a good dusting plane for someone who is in the business the year around. But when you convert a Stearman into a duster, it's not profitable to change it back. There are many changes that have to be made and it's fairly expensive to build this type of equipment. Three Old Men, Compton airport, Compton, California, build an excellent hopper for the Stearman. It costs $775.00 F.O.B. They will install this hopper in your airplane for $450.00. Spray attachments are an additional $1,000.00. That company also has a few Stearman dusters for sale for $4,250.00. These Stearmans have been entirely rebuilt, are powered by 300-hp Lycoming engines, have constant-speed props and are equipped with "Three Old Men" hoppers. The same ship with a 450-hp Pratt Whitney costs $650.00 more. Powered by a Continental 220, the Stearman runs $770.00 less than the original cost of $4,250.00. Pay load for this duster is in the neighborhood of 600 pounds. I have used both the J-3 *Cub* and the Stearman in my work and I find them entirely satisfactory.

The usual charge for dusting runs from 4 to 6 cents per pound, and you usually use from 25 to 50 pounds of dust per acre, depending upon the crop and conditions. Dusting is done from daybreak until the wind comes up, which varies in time from day to day. Two hours is usually the average time in the morning. Sometimes you can get in an hour of dusting in the evening before sundown. Most dusters start their operations about 20 minutes before daybreak, using the lights of the truck for markers, and they take-off toward them.

Liability and property damage insurance is a good thing to have. One time I was dusting with arsenic lead and a farmer had his cows grazing nearby. One of the cows ate some of the dust and died. Another time I tore down about 500 feet of wire and split a telephone pole, so you see it can really come in handy to be fully covered. The best policy is a $25,000.00 liability and property damage one.

Now before you go out and try your flight controls at dusting, here are a few things to remember that will help keep you in business . . . a profitable business. In the first place, the farmer is your employer. And there isn't anyone who figures his profits and losses closer than he does . . . so don't go around the country side unloading pounds of arsenic lead where it won't do any good. Keep your employer a friend. Do good work, and the farmer will tell his neighbors about it. Soon you'll find yourself working for the neighbor, too. One job done, good or bad, in a community and you can rest assured farmers for miles around will know all about it. SOooo, Mister Duster, build yourself a good reputation early in the game.

Here's a list of Duster's Commandments to paste on your panel in front of you. Read them often, follow them—and happy dusting.

1. Thou shalt not dust a field that hasn't been closely inspected for "hidden" obstacles.
2. Thou shalt strain gas through a chamois skin when using fuel from a drum.
3. Thou shalt not overload thy plane.
4. Thou shalt keep a careful watch for carburetor ice and stop operations when carburetor icing shows up.
5. Thou shalt dust only when calm (you as well as the wind).
6. Thou shalt use flag men where there are obstacles hard to see from the air.
7. Thou shalt never fly back through the dust.
8. Thou shalt give all obstacles plenty of room always.
9. Thou shalt do only the dusting jobs that can be done satisfactorily.
10. Thou shalt employ the sense of thy brethren the horse.

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Thunderjet

(Continued from page 46)

On the ground the tail blast of the P-84 is dangerous up to 150 feet, because of the heat and flying debris that may be thrown back. During the Maine winter the pilots discovered that the jet blast would rip great sheets of ice from the runways and throw them at planes taking off far to the rear. Since snow and ice seemed to be almost always present it was a continual problem. Even when cleared, the runways' black top shoulders brought similar troubles. The blast quickly softened the thin asphalt layer at the runway margins and demonstrated on the ground the verity of Newton's third law: "That for every action there is an equal and opposite reaction." Six-foot wide asphalt pancakes can be death-dealing missiles when blasted by the jets.

The admiration of the pilots is unrestrained when they appraise the work of the mechanics. "How these guys worked week after week in that freezing weather is beyond me," is the typical reaction of one experienced pilot. The layout of Dow Field at present is certainly not suitable for tactical jet maintenance. There is a definite shortage of hangar space (compounded by the presence of a Maine National Guard unit on the field with P-47's) and some special equipment has had to be developed as usage demanded.

With the aid of technical representatives from both Republic and Allison, the 14th's maintenance personnel have felt their way through new service problems and have worked out the bugs wherever found. The *Thunderjet* is compact with the amount of equipment packed into its sleek, slim frame. Because of the need for extremely careful inspections on a new job, the basic check periods run longer now than they will after the inspection routine is set. At every 10 hours of operating time a mechanic must edge into the tail pipe and, with a special light, check the condition of the turbine wheel. The extreme operating temperatures of the jet engine require inspection procedures that are slightly reminiscent of those used in checking turbo-superchargers on wartime aircraft, but much more complex.

Balancing the present maximum service time of 50 hours on the J-35 is the fact that the big jets can be replaced in under one hour. Top overhauls are performed at Dow but for major overhauls the engines are shipped to a central depot at Tinker Field. The Dow engine build-up line, the name for the top overhaul work, is in continual operation, replacing parts on standby jet engines, with most of the required work concentrated on the combustion chambers. The louvred combustion liners frequently crack due to differential pressures and temperatures, and must be replaced.

The 3,000-hour record of the 14th is as much a credit to its maintenance as to its safety-conscious flying.

The one great drawback in the tactical operating efficiency of jet planes at present is the amount of runway most of them require for take-off. Continually using up most of the 7,000-foot length available at Dow, the *Thunderjets* are no different from other present-day designs ordered by the Air Force. The acceleration of thrust power on the ground is much more gradual than for propeller-equipped planes, a comparison that is like the pickup of an automobile's fluid drive and that of a conventional transmission.

Many of the pilots seem to get an uneasy feeling of sideways claustrophobia when they get into the *Thunderjet* cockpit for the first time, especially if they switch over directly from the wide roominess of the P-47. In rebuttal, some of the men cite the very large RAF "exchange" pilot who flew with the group with very little trouble, along with several other pilots who weigh in at 200 pounds.

The cockpit arrangement of the flight controls is not as good as some of the bigger men would prefer, but their enthusiasm for the flying qualities of the plane at present outweigh the cockpit deficiencies. At the close of the winter some of the pilots were touching an average of 25 hours flying time monthly, so their knowledge of the plane is anything but sketchy. As they get more time any preference they may still have for previous types of craft they had flown seems to fade away. Except for a tiny minority who still long for the P-80's they trained in, most of the pilots have given a thumbs-up verdict to the P-84 after their first flights in it.

The major difference in flying a *Thunderjet* as compared with a piston-engine plane, aside from the increase in speed, is the absence of torque. The plane rolls easily and the adjustable booster aileron control system makes for positive control according to the individual pilot's preference. A push-slide system for fast elevator trim during high-speed maneuvers insures pull-out control during dives. The ease of control and excellent flying characteristics of the *Thunderjet* have been demonstrated at Dow in amazing pair-flying exhibitions at over 500 mph, involving Immelmans and barrel rolls, with a precision equal to that attained in any piston-engine fighter plane.

The P-84 climbs at over 350 mph and the absence of any feeling of speed in the cockpit beyond the initial acceleration at take-off has been known to bewilder pilots until they check their cockpit indicators to confirm the speedy climb. For flight control in dives, a fuselage door directly below the cockpit is opened to brake and stabilize the plane.

The strong construction seemingly inherent in all Republic-designed planes is not lacking in this one, as the pilots involved in the few accidents at Dow can testify. As a matter of history, before the *Thunderjet* went on the drawing boards, the Air Force toyed with the idea of re-designing the P-47 to accommodate the General Electric axial-flow turbojet for tests during the war, but it was finally decided to build a completely new plane, the XP-84.

With its prime equipment, the newly proved P-84 and its present flying and ground personnel, the 14th Fighter Wing appears ready to defend or attack or perform any duty the Air Force or circumstances may assign to it. That Maine winter they conquered was an effective crucible for the men as well as the plane. +++

PHOTO of portion of Dow Field, Bangor, Maine, was taken from the roof of the Operations Building, shows part of Base's P-84 fleet

Sky Ranch

(Continued from page 40)

on the long plank table. Sliding back a bench, we moved in and lost no time in getting to work on the food.

After breakfast, we gathered our camera and fishing gear and started for the airport. Our walk took us past long corrals and low-roofed bunk houses. Stocky paint cow ponies backed off the trail to eye us curiously and, farther along, a herd of prize Herefords stopped munching grass to watch us. Flying wires whistled overhead and a Piper *Cub*, with engine idling, glided in to the airport. The day's first flight instruction was under way at Flying L.

Our Cessna was gassed and waiting. Followed by Fielder in an airport *Cub*, we took off and flew seven miles up the valley to the Flying L hunting and fishing lease. Here we found a 3,000-foot all-weather strip flanked by three inter-connected lakes. Gliding in over the trees, we landed and taxied almost to the water's edge.

"Oughta have our best luck with flies," advised Tracy Rudd, ranch guide and fishing expert who daily shows guests how to snag the big ones. Since Peggy had never used a fly rod, Tracy explained the knack of putting a light line where you want it. Peggy didn't do badly, but after several trial casts decided she'd rather handle the light metal canoe and let Tracy catch the fish.

With deft flicks of the light rod, Tracy worked the water's edge. Wham! Dense lily pods exploded in a flash and spray as a two-pound bass broke water. Playing him with masterly skill, Tracy worked the bass alongside and had him in the canoe in a matter of seconds.

One hour and five bass later, we pulled the starter on our Cessna, taxied down the long strip, and headed into the wind for take-off back to the Flying L airport.

"Look at the turkeys!" Peggy exclaimed, pointing down the strip. Frightened by the blast of our engine, two hens and a lone gobbler sprinted for cover. We made a mental note to come back in season, and opened the throttle.

After lunch, we loaded our baggage and taxied across the airpark to the swimming pool. With our plane parked only a stone's throw from the pool, we could swim as long as we liked, and then be on our way.

Three o'clock finally rolled around and it was time to slip into street clothes and head for far-off Dallas. Three-thirty found us in the air and climbing leisurely to clear blue hills in the distance. At six o'clock we eased into the pattern at Dallas' Mustang airport, slowed the 140 to 65 mph, and set her down three-point on the smooth turf.

Total air time for the 600-mile round trip was 5 hours and 30 minutes. Average ground speed was 109 mph. Costs for operating the 85-hp plane—$8.14 worth of gas and oil.

As we loaded our bags in the car, a nearby student summed things up pretty nicely. "You know, I just can't wait to get that private license," he remarked to a buddy. "There's so darn many interesting places to go and see with an airplane these days!"

To which Peggy and I silently added, "Roger!"

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Dilbert

(Continued from page 37)

gently. Apply pressure smoothly; many nose-ups are caused by abrupt braking.

Nearly all taxi accidents are the result of carelessness. This carelessness may be the outgrowth of bad habits, or it may result from a temporary lapse of safety consciousness. In either case, it will get you into trouble. Don't be a Taxi Dope.

Forced Landings—The pros and cons of wheels-up versus wheels-down forced landings have been hotly argued in many a hangar bull session. In an effort to settle this important argument, the Navy some time ago made a study of the problem.

Case histories of all forced landings for an entire year were carefully analyzed. These included landings in swamps, mud, trees, wet and dry sand, soft ground, plowed fields, pastures, rough and rocky terrain, scrub growth and tree stump areas. The following results were noted in this study:

a. Very few serious injuries were received in forced landings when aircraft made contact in a normal attitude.

b. Nearly all the serious injuries resulted from nosing over.

c. Most of the nose-overs occurred as the result of landing with wheels down in uneven or soft terrain.

d. In rough and rocky terrain and stump areas, less damage resulted when wheels were down.

e. The position of the landing gear made no apparent difference when landing in trees.

As a result of this study, it appears advisable to make all forced landings, except those in rough and rocky terrain and stump areas, with *wheels up.*

The reason for the exceptions in rough and rocky terrain and stump areas is that with wheels up, the fuselage usually makes initial contact with such force as to cause rocks or stumps to cut deeply into the structure, or to cause the plane to nose over violently. If a landing is made with wheels down in such terrain, the undercarriage usually carries away upon initial contact, thus appreciably retarding the aircraft before final impact of the fuselage. If altitude permits, it appears preferable to jump, rather than to attempt a landing in terrain of this nature. If a landing is made, however, it appears advisable to make it in rough and rocky terrain with *wheels down.*

No fixed rules can be set down for forced landings on highways and on pastures and golf courses. Highways are often so narrow that planes have difficulty staying on the road, particularly in a cross-wind. Remember that ground which appears smooth and level from the air frequently turns out to be rough, crossed with ditches, soft, or full of obstructions when the actual landing is made.

The final responsibility for deciding whether to jump or whether to attempt a forced landing, and whether the landing should be made wheels up or wheels down, must rest with you. Since there is often little time to properly weigh all the factors involved once a forced landing becomes im-

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USAF News

(Continued from page 8)

air battles than any other man in history was ready to fold his wings. President Truman made the official announcement the following day and immediately nominated 49-year-old General Hoyt S. Vandenberg, present USAF Vice-Chief of Staff, to succeed Spaatz.

General Vandenberg was sworn in as Chief of Staff on April 30. At the time of writing, Major General Muir S. Fairchild, head of the Air University, was being recommended for the Vice-Chief job vacated by Vandenberg.

"Tooey" Spaatz, known today as "the world's greatest air strategist," started his military career as an infantryman. Commissioned a 2nd Lt.-Infantry upon his graduation from West Point in June, 1914, he did his first tour of duty with the 25th Infantry in Hawaii. His career as an airman began the following year, in October, when he entered flying school at San Diego. Less than two months after winning his wings in May, 1916, Spaatz was on his way to Mexico with Pershing's Punitive Expedition, serving with the First Aero Squadron. His silver bars came through in July. He went to France in 1917 as Captain Spaatz, CO, 31st Aero Squadron, returning in 1919 as a temporary Major with three German Fokkers to his credit plus a DSC for heroism.

How Spaatz managed to bag the three Huns despite the fact that during most of his overseas tour he was stationed at the huge American Aviation School at Issoudun is best told by his citation for the DSC. It records that although he had received his orders to return to the United States, "he begged for and received permission to serve with a pursuit squadron (13th Sqdn.-2nd Pur. Gp.) at the front." On the day of a big attack west of the Meuse, "Tooey's" flight ran into a covey of Fokkers, two of which he shot down in the free-for-all that followed. "In his ardor and enthusiasm," the citation says, "he became separated from his patrol while following another enemy far beyond the lines. His gasoline giving out, he was forced to land and managed to land within friendly territory. Through these acts he became an inspiration and example to all men with whom he was associated." To the men who wear the silver wings of the Air Force, Spaatz is, and always will be, "an inspiration and example."

Spaatz received his permanent gold oak leaf in 1920 and became CO of Kelly Field. Later, he commanded the First Pursuit Group and, in 1929, won the DFC for commanding the *Question Mark* during its historic refueling and endurance flight.

The 150-hour flight of the *Question Mark* provided the occasion for another display of the characteristic Spaatz courage and tenacity. During one of the refueling operations, a gust of air bounced the tanker-plane upward, pulling the hose out of the tank of the *Question Mark.* Thoroughly soaked with gasoline, Spaatz stripped off his clothes and waved the other plane back into position. Despite the near-freezing blasts of air which whipped at his gasoline-drenched body, Spaatz stuck to his post until the refueling was completed.

Spaatz was promoted to Lieutenant Colonel in 1935. In November, 1939, with the war underway in Europe, he received a temporary promotion to the rank of Colonel. After a two-year stint as head of the Air Corps' Materiel Division, during which time he was promoted to temporary Brigadier General, Spaatz returned to Washington in January, 1942, to become Chief of the AAF Combat Command. Four months later, with another star on his shoulder, he was assigned to command the 8th Force in England. In December, he moved to North Africa to command the 12th Air Force, leaving the 8th to a fellow crew member of the *Question Mark,* Ira Eaker. He got his third star in March. Spaatz returned to England in January, 1944, to the biggest assignment of his career—the command of the U. S. Strategic Air Forces in Europe.

In March, 1945, he was made a 4-star general and, in June, returned to Washington. A month later he was on Guam directing the final strategic air attacks on Japan. After supervising the delivery of two atomic bombs, he came back to headquarters where, in February, 1946, he took over command of the AAF following the retirement of "Hap" Arnold.

At the present moment, "Tooey" Spaatz is probably out fishing. In between his missions to nearby trout streams, he plans to write a book on air power. That's a volume we will all be waiting for.

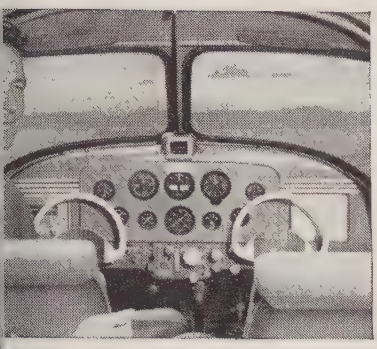
And he's going to settle down in Washington, within easy hailing distance of the Pentagon. "Tooey" Spaatz has taken a seat on the bench, but he'll be ready to play ball again whenever he is needed.

PICTURE CREDITS

Following list gives source of Skyways' photos

Pages 14, 15, 16—Air Force photos by Wing Photo Lab, Dow Air Base, Maine; 17, 18, 19—Don Downie; 20, 21—Goodyear, Bellanca; 22, 23 — Joe James; 24, 25, 26 — Cessna Aircraft, Downie; 27 — Ross-Pix; 28, 29 — H. J. Arnold; 30, 31 — Lockheed Aircraft; 32, 33, 34 — Institute of Aero. Sciences, Goodyear; 35 — Ross-Pix; 40 — Flight; 58 — Piper, Northrop, Howard Levy.

NLY RYAN NAVION HAS...



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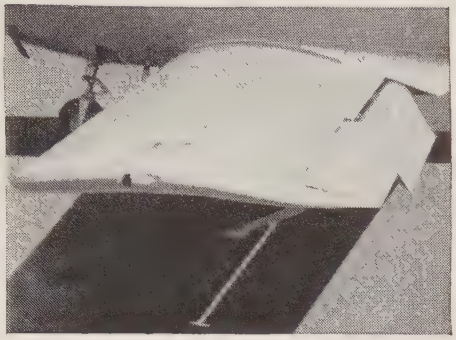
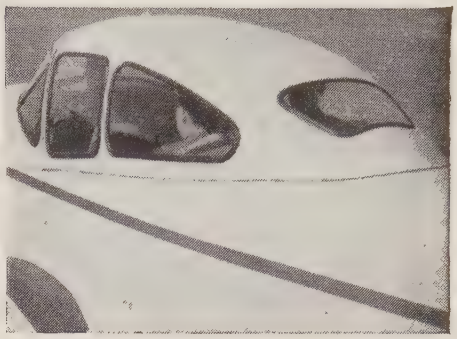
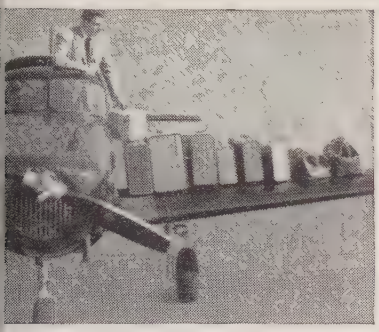


2 HIGH-LIFT FLAPS. Large, slotted, full-deflection flaps give the *Navion* slowest, shortest landings of any plane in its class. Stall-resistant wing gives full aileron control for maximum safety in slow flight and landings.



3 FULL-VISION CABIN. Here's visibility designed for Sunday traffic. Seven large, clear windows let you see in every direction. No blind spots while flying or taxiing. You can even use a rear-view mirror...see 12° down over *Navion* nose.



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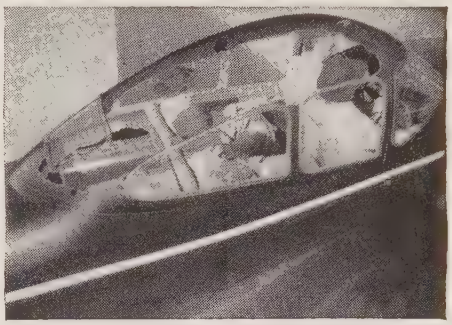

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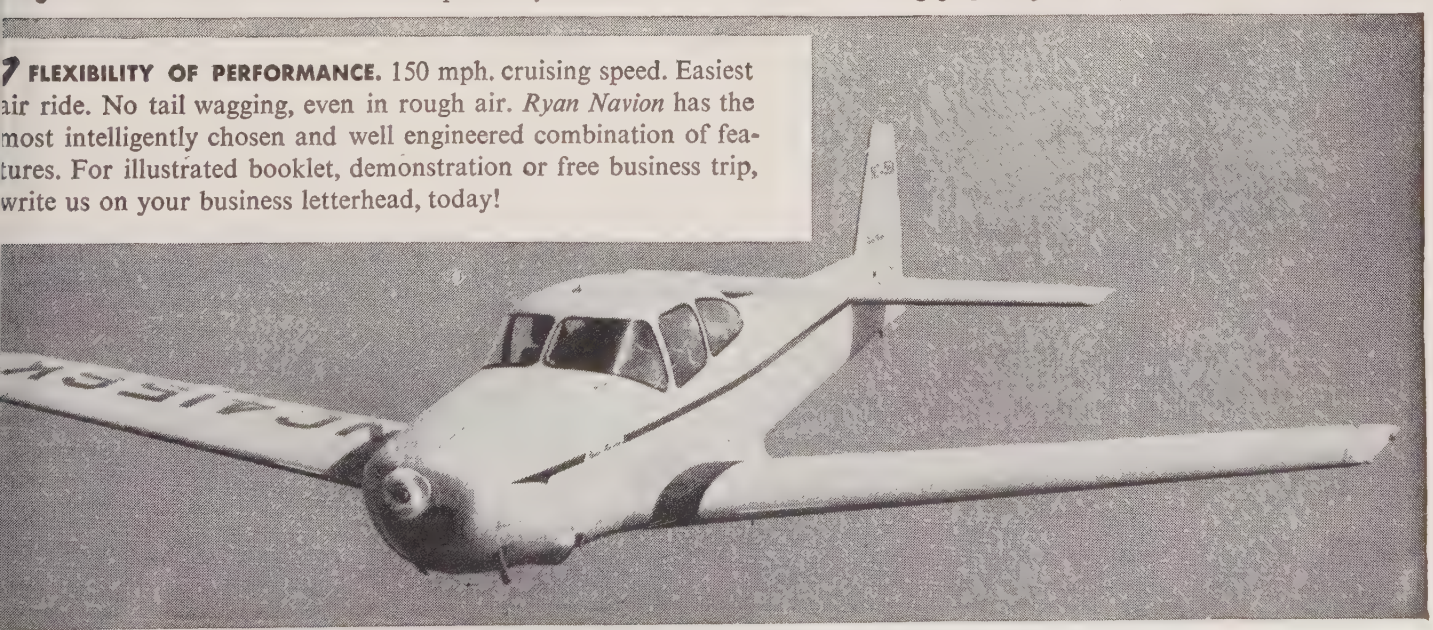
7 FLEXIBILITY OF PERFORMANCE. 150 mph. cruising speed. Easiest air ride. No tail wagging, even in rough air. *Ryan Navion* has the most intelligently chosen and well engineered combination of features. For illustrated booklet, demonstration or free business trip, write us on your business letterhead, today!



Thoroughly Proven Post-War Plane *Ryan Navion*

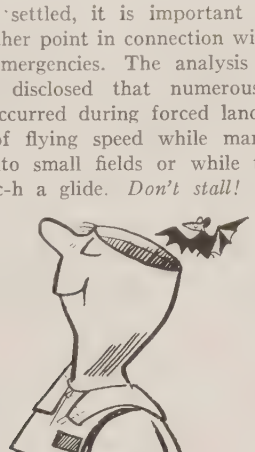
Rely on Ryan RYAN AERONAUTICAL COMPANY, 207 LINDBERGH FIELD, SAN DIEGO 12, CALIFORNIA

Dilbert

(Continued from page 50)

minent, serious study should be given this problem to condition yourself for taking correct action if such an emergency arises.

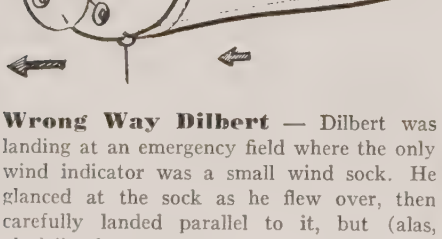
Now that this wheels-up-or-down question has been settled, it is important to bring up one other point in connection with forced landing emergencies. The analysis of these accidents disclosed that numerous serious crashes occurred during forced landings due to loss of flying speed while maneuvering to get into small fields or while trying to s-t-r-e-t-c-h a glide. *Don't stall!*



No Brains—The pilot of a heavily loaded cargo plane elected to land in a power-off stall. About 30 feet above the ground, the ship dropped out from under him. The plane was a washout—so was the pilot's job.

It didn't take the Thin Man to solve this mystery. The heavier the gross weight of an airplane, the greater its stalling speed. Stalling speed also is greater with power off than with power on. The way this plane was loaded, the figures showed that stalling speed with flaps down and power off was 9.4 mph faster than with power on.

Even a half-wit should know that you make a power-on stall landing with a heavily loaded plane. Believe it or not, the pilot in this case had 3,400 hours flight experience. It must have been a case of mental aberation. Make certain you don't aberate in a similar fashion.



Wrong Way Dilbert — Dilbert was landing at an emergency field where the only wind indicator was a small wind sock. He glanced at the sock as he flew over, then carefully landed parallel to it, but (alas, alack!) down wind. Result: Groundloop and noseover.

This fool maneuver has been going on ever since the first wind sock was invented. Which indicates that Darwin's evolution theory is working out mighty slowly, at least as far as aviators are concerned.

To keep from pulling a dilbert like this, remember the old rule-of-sock: Fly *out* of the sock, never into it.

Short on hp . . .

(Continued from page 34)

horsepower we have gained but 5 mph, lost about 370 feet per minute in our climb rate and can carry only 165 more pounds of extra useful load . . . which is just about one passenger. Not much of an improvement for twice the horsepower, 280 pounds more weight and a price tag way up there.

The trouble with us was that we wanted more speed and all-around performance, so we installed bigger engines in our light airframes. This called for heavier mounts and bigger airframes, with the net result that we were right back where we started — except for a higher price and, in some instances, a passenger. Not satisfied, we once more added a bigger engine and again a bigger frame and price tag to keep pace. Now we find we have "added" ourselves right out of private flying. From a 35-hp engine we have climbed to 40 hp, then 50 hp, 65 hp, 85 hp, 100 hp, and on up, with the performance not much better than we had 10 or more years ago. The price tags have had to keep pace, with the result that today $2,500 will hardly get you off the ground in a trainer. Se we keep both feet on the ground!

Look what happened to Aeronca, for example. Back in 1929 they produced their little C-2 and C-3 one- and two-place ships. These were powered with engines turning out about 25 hp. The 26-hp C-2 model, however, flew nonstop from Cincinnati to New York, about 600 miles—a darn good hop nonstop for the modern lightplanes of 100 hp and costing several times what that little ship cost. Those little ships, with no refinement of design as we know it today, no attempt at streamlining and without the modern engineering techniques, gave a lot of men their first flying on less than 30 hp. Today the Aeronca planes cart around 65 hp and 85 hp and have ranges of 270 miles and 400 miles.

Certainly it's fun to go X-country but it's just as much fun to fly a couple of hundred miles or so and then stop off for gas, a rest and a chin with the boys before you go on . . . or to fool around within 25 or 50 miles of your home field over a weekend. Most pilots just want to fly for the fun of it, get up where they can look around and try out their hand at the controls every few days. They can't do it at the present rentals or price tags, but a really low-powered lightplane would let them do it.

Back in the early '20's there was a re rash of ultra-lightplanes in Europe. The was the Parnell *Pixie* with a 6-hp engin There was the *Wren* that took off and fle under its own power of 2½ hp, the Brist *Brownie* two-placer, with a 16-hp engin the Parnell *Pixie* "3" two-place with a 16-h Bristol *Cherub* engine, and the Udet *Ste lite* seaplane with two 7-hp engines.

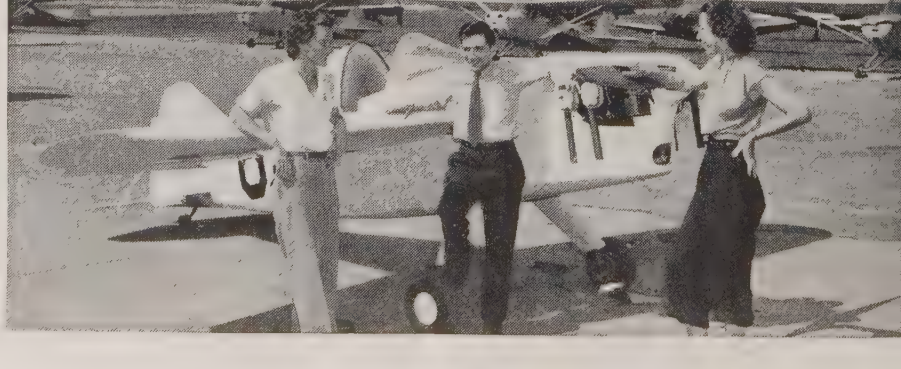
It was natural that Europeans start th craze for ultra low-power engines and ai frames with their limited gasoline, as witne their small cars. All of these little plan looked like airplanes and gave their pilots chance to *fly,* which, after all, is what w want to do. Better that than to sit arou and wish we could. The super-lightplan would get us all into the air at least, but w Americans have always been worshippers "bigger and more powerful" anythin whether cars, planes or washing machine and so we are suffering—as far as priva flying goes at any rate—on the ground in stead of in the air.

To use a really light low-power engin the airframe must be highly efficient, th wing at high efficiency at low speed, th covering as smooth as possible with the dra from skin friction knocked as far down th scale as humanly possible. The result woul be really something if the American aero nautical engineer would get to work on i The Belgians tried it and look what the did with but 32 horsepower. The Belgia *Tipsy* S-2 was a little low-wing single-seate with an open cockpit and panted landin gear. It had a fast look about it and fo 32 hp it was—with a top speed of 103 mp Think what we ought to be able to do i this country with 32 horses if we'd sp on our hands, grab our slide rules a really *try!*

Of course we need ships like the Ry *Navion,* the Piper *Super Cruiser* and t Luscombe *Silvaire,* the Aeronca *Sedan,* a *Champion,* the Beech *Bonanza,* the Conva Stinson *Voyager* and all the other so-call lightplanes, but for getting the average cha into the air we need *low*-powered, *low*-price aircraft that are cheap to build, fly an maintain. We must get over our idea "big stuff" and cater to the same sort chap who loves motor boats but runs a outboard. He doesn't go on long cross-wat cruises but he does a lot more for moto boating than the owner of a super expre cruiser, and what a market he has bee for the light boat and motor manufacturer

We should tap the great well of "loc Lindberghs" who just want to fly, build u

HURLBURT HURRICANE, a midget racing plane named for the late Marge Hurl burt, was owned by two Cleveland, Ohio girl flyers. It was flown by Joe Smith *(center*



a few hours, and buzz around a couple of hours when the weather is fine. Not many of us have the time to go cross-country and even if we did most of the ships we could fly won't take the whole family anyway. How much more flying we would do if we could fly cheaply around home whenever the weather was fine, without feeling guilty about the cost. It reminds me of what one weekend pilot said as he landed after a fairly short cross-country hop in a rented ship. Someone asked him where he had been. His reply was "I've just flown the new-suit-I-won't-get-now cross-country and back."

Even cross-country in a super-lightplane is possible baring heavy winds, and who wants to fly then anyway. Even at the 50 mph of the low-power plane, it's straight-line travel and your traveling by air, which is the main objective.

It can be as relaxing to saunter around a county in a super-lightplane as it is to roar around the country in a bigger job, and a lot easier on the nerves and pocketbook. As far as the sporting angle goes why not use our imagination? An entirely new type of contest can result and a new idea for flying clubs can come into being with the very lightplanes and the ultra low-horse-power engines. The ease with which these little ships can be flown was demonstrated to the author many years ago when we were learning to fly gliders. One of the gang, George Edwards, had one of those early Aeronca low-power planes. As an experiment he fitted a long curved skid out in front to protect the prop and let some of the student glider pilots try flying it. Some of the students flew it with no trouble at all after having piled up the huge amount of about 10 minutes of glider flying during many short solo hops in the Franklin PS2 glider. It's that easy.

A sign in the right direction was the Goodyear race at the last Air Races at Cleveland. It was the first really novel race event in years and really had the stands in a lather. The racers were limited to 85 horsepower . . . and what they did with those 85 horses was plenty. The planes that entered this race rolled out of hangars, barns and sheds all over the country, marvels of slick designing and clever construction, and all bent upon winning some of that $25,000 put up by Goodyear Tire and Rubber Co. as prizes. After all, when you have but 85 hp to win a race with, you *have* to tailor the airframe with one eye on efficiency and the other on the scales. The results of this sizzling race proved several things.

First of all it proved that there is still plenty of design ingenuity left in this country. Second, it proved that there is a lot of "oomph" in 85 horses if you give it a break with a clean airframe, and thirdly, it proved there is audience appeal in the low-power stuff. The big racers put on a good show but the talk of the day was the Goodyear racers.

Let's do more than talk about low-power aircraft and ultra-lightplanes. Let's see who can fly the best on the least horsepower. Let's develop flying skill rather than bigger and more powerful and more expensive aircraft. Let's get our feet off the ground in a *really* lightplane and start flying for fun rather than to keep our billfolds flat.

Co-Pilot's a Dummy

(Continued from page 18)

how Mrs. Bergen would react when I told her we were lost," the comedian explained, ". . . and she didn't disappoint me. She looked at the gas gauges and started to survey the pine-covered forests below for possible landing fields."

" 'Well, what are you going to do about it?' she asked without too much anxiety in her voice."

"I finally got squared away on the map and found that while I'd mis-calculated my ground speed, I was nearly on course after all. We landed at Eugene, Oregon, without further difficulty."

Because of his close association with instrument training, Bergen makes complete flight plans on even his short hops. He tells this story on himself about the trip he made from Glendale to his East Los Angeles Airport. The day was extremely hazy and Bergen pulled up through the misty overcast. He flew a compass heading for the required 18 minutes and then let down. Sure enough, there was an airport directly under him, but it wasn't East Los Angeles. The field was the now-abandoned Alhambra strip, at least six miles north of his East L. A. destination.

Soloed in '38

Bergen soloed in 1938. Among his instructors were stunt pilot Al Lary and the late Tex Rankin. He bought a Stinson 105 and flew it until the war restricted him to the passenger cabin of military transports enroute to numerous camps shows. He says that he has logged considerable off-the-record dual instruction in transports and once even landed a four-engined B-17. Typical of his entertaining trips was an overnight jaunt from Hollywood to Galveston, Texas, and return to give just one military performance.

After the war he bought a surplus Fairchild PT-19, but the back seat proved too breezy for passenger comfort. Both his present planes are radio equipped, "But I don't play any music or commercial programs on them. I get enough of radio entertainment during working hours." Nearly all his flying is a get-away-from-it-all hobby, making it an easy matter for him to take quick hunting and fishing trips. He plans to take his wife on a trip to Florida when his show closes for the season.

Bergen invented a plastic check list for pilots with items listed in two columns; one for take-off and the other for landing. When an item is checked for take-off, it's pushed over to the landing side of the card to be re-checked at the conclusion of the flight. However, the actor found that he couldn't patent the gadget since it was too similar to an office reminder system.

"I keep a messy log book," says Bergen, "but I've logged somewhere between 400 and 500 hours. In all that time, the only spot I was in that could have been serious was when I had Charlie in a suitcase beside me. I nosed down to come in for a landing in my Stinson 105 and Charlie slid off the seat and jammed in behind the stick. I really had my hands full for a minute. I could almost hear Charlie call from his traveling case, 'Hey, you big knucklehead, gemme up off the floor!"

After making the pictures to illustrate this story for SKYWAYS, the author accompanied Bergen on a short hop from Glendale to his East Los Angeles Airport and return. The ventriloquist does a smooth, heads-up job of flying the heavy BT. His pre-flight and warm-up procedures were methodical and unhurried. He was very easy and smooth with his engine controls. Once in the air he relaxed visibly and seemed to forget the tension and rush of his various Hollywood enterprises. Regardless of the length of hops, he always wears a parachute and requires his passengers to do the same.

On the ground at East Los Angeles, a new employee on the gas truck failed to recognize the field owner as he taxied up to the line. Without cracking a smile, Bergen asked, "Is this Long Beach?"

The youngster looked astonished and pointed south. "No Sir, Long Beach is 20 miles from here!"

Still with a straight face, the comedian asked that his BT be filled with gas, and then told the truck driver to put the cost on his bill at the airport. "I guess Charlie would have tried to fast-talk him out of the bill, but why should I try to gyp myself."

The ventriloquist had a cup of coffee, batted the breeze with the restaurant waitress, and then went sound asleep under the shade of an awning near the office. Much later he awoke, looked slightly surprised, and said, "I've got a late benefit show to do tonight, so I guess that it's time to get back to Glendale. It seems that the only time I can get away from Charlie is when I fly."

The man who made a dummy come to life climbed into the front pit of his BT, taxied slowly down the runway, then took off for Glendale and another radio show.

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(Continued on page 56)

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(Continued from page 55)

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PLANE SERVICE

TIPS FOR THE PLANE OWNER

ACCESSORY SUBSTITUTIONS. When a service operator or a mechanic replaces engine or aircraft accessories in your plane, don't always take his word for it that the new part, if made by a different manufacturer than the original, is "just as good." Make him prove it to you by showing you the authorization in the manufacturer's supply tables or any other legitimate bulletin. The new accessory should be the same type as the old one and should perform exactly the same functions. If it's for the engine, CAA Aircraft Engine Specifications, which the service operator should have on file, shows all CAA-approved engine accessories for particular types. This caution is not because operators are unscrupulous and are out to gouge the customer, but occasionally they have been oversold on accessories by salesmen and have to unload extra stock, or they may get a larger profit margin on the products of one company contrasted with another. Propeller and instrument installations allow the greatest leeway, but they still have to be within authorized performance limits and it's best to see the figures in black and white rather than go by verbal estimates of their worth in doing the job. Instruments are among the accessories that most often have to be changed for higher-priced or different makes because some manufacturers install low-priced equipment at the factory that doesn't always stand up in tough service. Check with operators and find out what kind they install in their own planes when they have to make replacements. Neither the least expensive nor the most costly are always best, so take care.

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SPARK PLUGS. A mechanic told me a story recently about watching a smart cookie working on the engine of his plane, cleaning it, changing plugs and doing other assorted small work that helps to keep a plane in tiptop shape. Everything was swell until the plane owner started to check his plugs. He used a standard wire feeler gauge to test the electrod gaps in the approved manner, but then the mechanic almost collapsed as he watched the owner take a knife out of his pocket and proceed to enlarge one of the gaps by forcing the tip of the blade between a side electrode and the center electrode. Never, never try to re-gap a spark plug without the use of a precision gap-setting tool. Don't install in your engine any plugs that are dirty or not within tolerance. On long cross-country flights it's a wise pilot who carries a complete set of new plugs along. Those maintenance checks sometimes set a guy down where even the simplest parts seem to be out of stock or not readily available.

•

MAPS. Sloppy airport operators have a niggardly habit of keeping out-of-date maps in stock and unwary pilots continually report having been stung because they didn't keep up on chart revisions and issue dates. When you buy a map, check the date against the latest government chart list. Airports should have current copies of the Airmen's Guide and the Flight Information Manual available for pilot reference. If you do a lot of cross-country gallivanting they're practical necessities in laying out routes.

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COCKPIT SAFETY. Enough crash statistics have been thrown at private flyers by now to convince them that something dangerous exists in the cockpit of every lightplane in service today. Frequently, those dangers have been increased by the pilots themselves. As long as shoulder harnesses or other upper-body protective belts are not installed in the planes, any sudden stoppage that throws the pilot forward against the wheel, control column or even instrument panel (if the stoppage is violent enough) is liable to result in chest and face lacerations, at the least. The pilots who have increased the liability are those with extra instrument installations extending out of or above the normal panel area, usually special radio devices or magnetic compasses placed high for convenient reading. Okay, standard private plane shoulder harnesses are not available, but there's nothing that prevents a smart pilot from insuring in some small way that sharp-edged equipment toward the front of the cockpit is shielded as a measure of protection for himself. One-inch-thick sponge rubber pads, either cemented, wired or taped to the offending area without blocking instrument readings will help in preventing the face and chest gashes that occur in many small-plane accidents—and that proverbial ounce of prevention can be worth more than ye olde pound of cure.

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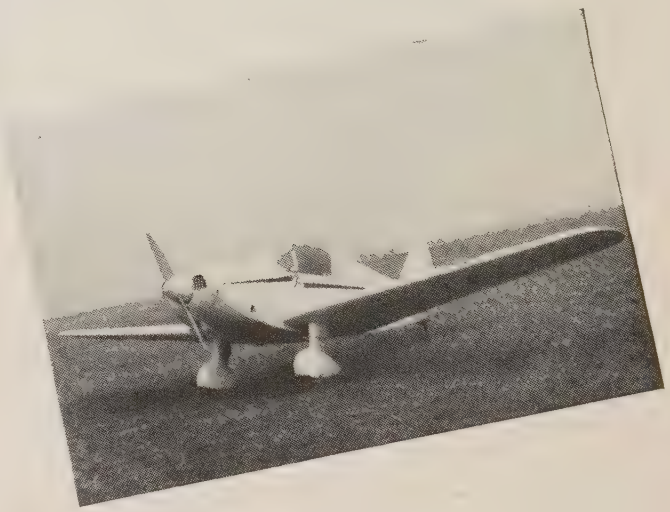
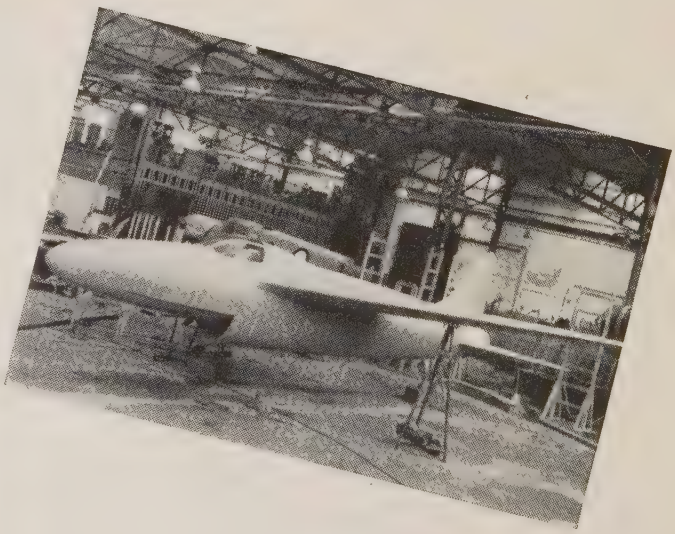
PIPER PA-15, called the *Vagabond,* is Piper's new two-place, side-by-side ship. This is the first two-place, side-by-side ship Piper has built since the well-known *Cub Coupe* of a few years back. Powered by a 65-hp Lycoming engine, the *Vagabond* cruises at 95 mph at 75 per cent of power, and has a landing speed of just 38 mph. The ship has baggage allowance of 40 pounds, tanks for 12 gallons of gas and 5 quarts of oil, is equipped with brakes and muffler. Price is listed $1,990.00 FAF.



SIPA S/90 is one of the newer two-place French personal planes. One version is equipped with 85-hp Continental engine, has a cruising speed of 110 mph and a range of 400 miles. This ship has dual controls, toe brakes. Reported to be an easy-to-handle airplane, the makers of the S/90 predict their ship will win a place of honor as either a sport plane or an executive plane for the flying businessman having to make calls around country.

NEW... on the wing

AERONAUTIC ARSENAL VG-70 is a French jet research plane that is under construction today. A single-seater, the VG-70 is powered by a Jumo 004B gas turbine having a static thrust of about 1,980 pounds. This research ship is soon to be test flown, and authorities predict it will have a top speed of close to 560 mph. Wings and tail of the VG-70 *(right)* are sweptback. Slots are built into leading edge of wing, and its spoilers are retractable.



NORTHROP *RAIDER,* designated the C-125, is an assault transport being built for the USAF. It is the military version of the *Pioneer.* Powered by three Wright *Cyclone* engines, the C-125 is said to have a cruising speed of 185 mph, a landing speed of 62 mph (with flaps) and a range of 1,750 miles. Feature of this ship is its landing gear which has been built to take rough operation, and its short take-off run of considerably less than 500 feet.

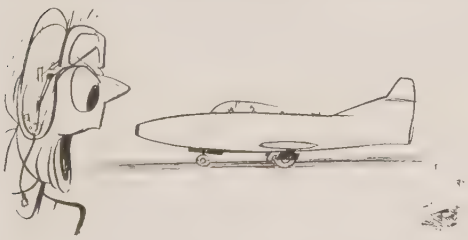
how to fly a JET

how to fly a JET

THE fighting forces have been moving from here to there in any number of ways — dog cart, jalopy, k a y a k, scooter, and paddle wheel steamer. Some still walk, although the idea always has been to move as quickly as possible. If the old Southern warrior who talked about "gittin thar fustest" were still around, he would raise one end of his walrus mustache at the sight of the Navy's newest and most astonishing method of going from one spot to another in a hurry. It's the scoop and whoosh device called the turbo-jet engine.

At air stations, where the flying gentlemen pause in the day's occupation to make cracks about the way the other guys louse

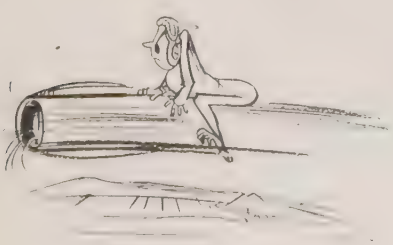
up their landings, the sight of a jet generally



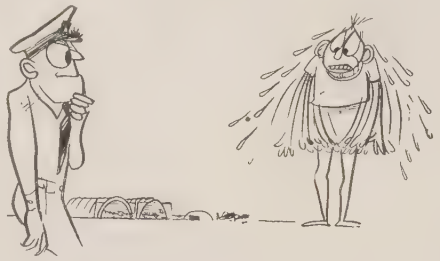
provokes long, thoughtful looks. The reasons are:

1. Jet planes have no props;
2. They hug the deck;
3. Jets have no props;
4. They certainly are fast; and
5. They have no props.

Even the toughest pilot does a quick double-take when all he sees is a scoop and a hole, and if he didn't know better he'd say the airplane was hung up for an engine change. He has learned to rely on the windmill out front, so when he thinks about



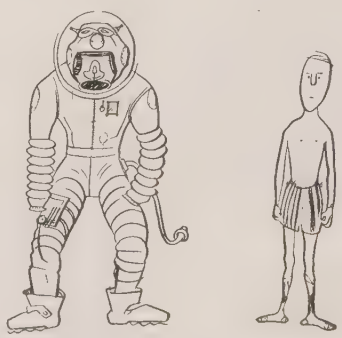
being up there with only a scoop and a whoosh between him and a piece of North America, he feels as naked as the sleep walker who turned up for the admiral's inspection in a "T" shirt and nothing else.



The article he read last week gave him some strange ideas too. He saw a character in a football helmet buss the little woman goodbye, hop into his jet plane, wheep into the air, and go through hell in the blue.

"Joe Jet tempts fate once more in the winged Thunderjug," the article said and there were pictures to prove it. Joe sweated and strained. He dipped and he weaved. He made terrible faces at the camera. When Joe finally got back on the ground — the article said he might not make it—everybody made a big fuss. The lady friend kissed one hand while a bearded doc hung on to the other. There were cries of "Good old Supersonic Joe" and heartly cheers.

This made interesting reading and our friend is not to be blamed much for thinking the pilot of a jet plane is considerable of a hot rock, if not a 14-carat Superman. So he pats the yoke of the old faithful PBY, shudders when he thinks about the death-defying jet pilots, and mutters, "Not for me, bub."



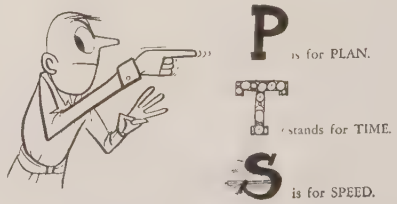
Joseph Pendennis Jet was born in Gaffney, South Carolina. He weighs 160, stands five feet eight, and has a scar on his leg that was deposited by an irritated dog when Joe was a small boy. The death-defyer lives in a vine-covered cottage with his wife Myrtle and two children, Cherl and Earl. If Joe stays out too late in the Thunderjug, Myrtle gives him hell because dinner is cold and the kids are hungry. "Quit making faces," says Myrtle, "and set the table."

On a Sunday spin with his family in the Chevrolet, Joe shakes his head over the way other drivers risk their lives passing on hills and curves. He orders little Cherl off the seesaw because she might fall two feet and hurt herself. The last ride he had on a roller coaster turned him green. "The Thunderjug was never like this," said Joe at the time.

Joseph admires the jet airplane. In an expansive mood, away from the cameras, he'll go so far as to say it's easier to handle than an SNJ. He likes its smoothness, the absence

of vibration. He likes its speed. The difference between Joe and the gent who regards the jet with suspicion is that Joe knows the jet and respects its advantages and limitations.

In short, though no Superman, Joe knows his PoinTS. The pilot who knows his P-T'S



is the one who will fly the Navy's new jets skillfully and safely. The briefest examination of the elementary facts about the turbo-jet engine should convince even Dilbert that

To fly through the air with the greatest of ease,

It's smart to remember the basic P-T'S.

Because the turbo-jet engine is a different kind of power plant, it seems reasonable to have a pretty good idea of what it is that: a) keeps you in the air, or b) doesn't. What's more, it's very simple stuff.

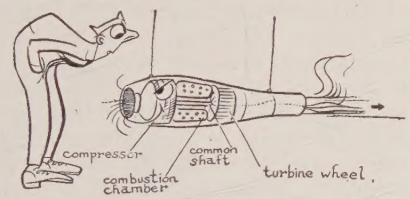
Mr. Slerts, the high school physics teacher,

used to toss off a certain sentence in the manner of an Oscar Wilde character whipping out an epigram. "To every action," said Mr. Slerts, crooking a little finger, "there is an equal and opposite reaction."

The great man would prove his point by pushing a desk a little way across the room and demonstrating that, while the desk moved in one direction, the equal and opposite reaction was working on the Slerts feet, which were slipping back while the desk was sliding ahead. Expressed more precisely, the principle the good man had in mind was: "Action and reaction are equal in magnitude and opposite in direction."

It is the Slerts Principle that explains why a turbo-jet engine can move an aircraft.

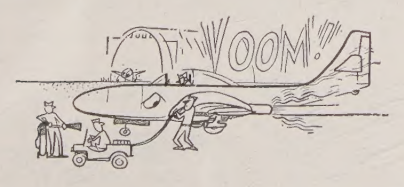
The engine is so simple it makes Dilbert suspicious. Tell him the important working parts are: 1. air intakes, 2. compressor, 3. combustion chamber, 4. turbine, and 5. exhaust nozzle, and he looks for the joker. "Can't be," he says, "this is the Machine Age and everything is too complicated."



This machine isn't. A force is created inside the turbo-jet engine to produce an equal and opposite reaction, just as Mr. Slerts said. Air is drawn into the intake and compressed. The compressed air passes into the combustion chamber, where it burns after being mixed with fuel. The gases resulting from this combustion whoosh past the turbine wheel, causing it to spin faster, and then they go on out the exhaust nozzle, gaining speed all the time. The thrust of the gases develops a reaction in the opposite direction and into the air goes the jet airplane.

The turbine wheel is not a propeller but simply a device for helping the compressor by sending its energy back by means of the common shaft on which compressor and turbine are mounted.

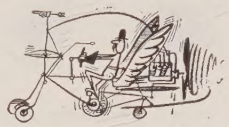
Starting the turbo-jet is a matter of developing sufficient compression by spinning the compressor and the attached turbine wheel fast enough. When the compressed air enters the combustion chamber in the right volume, the air-fuel mixture is lighted by a hot spark. Current models use an external power source to whirl the turbine, and relay switches light the fire at the proper time.



That's about the size of it. The thrust of the gases and their *direction* causes the equal and opposite reaction. Controlling the push or thrust of the gases by regulating fuel flow makes the jet aircraft go faster or slower. As long as Joe Jet gets the proper amount of thrust, the Thunderjug stays in the air.

Riding through courtesy of a physics principle may seem pretty risky to Dilbert, who forgets that this one is an ancient mechanical law. Nobody can repeal it now.

A quick glance at a cutaway of the turbo-jet in the FD-1, for example, and at the engine instrument panel is a pleasant surprise for the pilot accustomed to the complications of modern aircraft. Everything looks simple and easy. The engines have only a few moving parts. The fewer, the better, as everyone knows. A conventional engine has hundreds of gadgets to get out of whack; the turbo-jet has only four or five. The oil system is



efficient but elementary. Engine weight is cut almost in two. There are no mags to check.

Peace it's wonderful!

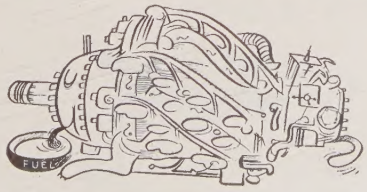
But this is an imperfect world and the chances of getting something for nothing are still pretty slim. The F.B.I. nabs the bank cashier just as the 20 to 1 shot he backed with the First National's dough is 10 lengths ahead in the homestretch. The small boy snags the cookie jar and falls on his noggin. The hobo hides under the old maid's bed, but it's an old maid's bed.

The turbo-jet engine has limitations and Joe knows what they are. That is why Joe minds his P-T'S.

Here are two facts every jet pilot should know:

1. The turbo-jet engine uses a whale of a lot of fuel and uses it fast.

2. The engine reaches its peak efficiency at close to maximum RPM at high altitudes.



In other words, the jet pilot must account for every minute of the time his engines are working. He can make them work best when he's up high and going fast.

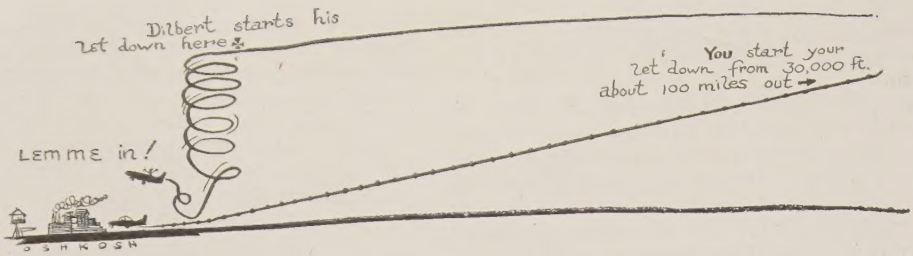
"P" as in Plan rates higher than "p" as in parachute. Dilbert may be smart enough to remember one of the two facts and still run into more trouble than a house detective with the Legion in town. He'll say, "The trick is to get up high and open her up. I'll be saving dough for the Navy because she won't use as much fuel up there as she does when I taxi." So far, so good.

Up he goes then to 30,000 feet and roars along at maybe 350 knots (about 410 mph). He doesn't have the sensation of speed because the jet aircraft is smooth and sweet to handle. Because the air is thinner up there and his engine more efficient, he's getting more speed than he would with the same throttle setting at 2,000 feet. He maneuvers around a little but not much. "Ah," says Dil, "getting low on gas. Now for home and mother."

So he noses down, picks up too much speed, pulls back on the stick, noses down again. By the time he finishes horsing around, he has wasted precious fuel getting down and, of course, he hadn't figured on this when he calculated how long he could stay in the air. Panicked, he loses track of where he is, forgetting that the kind of navigation he can get by with in the SB2C is almost useless at efficient jet speed when about all a good man can identify safely are nice, fat rivers and stretches of coastline. So, while

he hollers for a fix, Dil burns up more fuel. Finally when he's ready to crack his flaps and let down his wheels, he's too far from home to make it and carves his own runway in a corn field.

In the jet business, you don't make up a flight plan as you go along. The way fuel runs out, it's absolutely essential to figure out more carefully than every before the safe margin to have in the tanks in order to get back home. *(Continued on page 62)*



how to fly a JET

(Continued from page 61)

Joe Jet isn't really a death-defyer. He knows his PoinTS. The Dilberts who don't are asking for trouble. The turbo-jet engine works better at high altitudes and speeds, sure; but the smart gent doesn't forget that he has to *come down* and slow down in order to make it back. The lower down, the

less efficient the engine; the slower, the more fuel it uses for what it gives. What you learned about economical cruising speeds in conventional training is out as far as the jet is concerned. Hang in the air the way you do with a propeller-driven aircraft and you're not saving the taxpayer a dime. It's confusing but true.

J. P. Jet has all this in mind when he makes his plan.

Our boy plans in terms of *time*, the "T" factor. With the turbo-jet eating up anywhere from 300 to 500 gallons of fuel an hour, he'd be a fool if he didn't. With drop tanks, the jet aircraft has about the same range as the conventional fighter but does the job more quickly. You cover the ground fast.

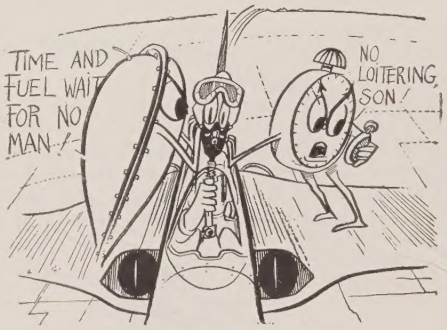
It's a good bet to know the answers to the questions you've been asking yourself since the day you had your first solo:

1. How long can I stay in the air?

2. How far will I go at normal cruising speed?

3. Will I have *time* to get back with the fuel I'll have left?

In the jet, you don't have time on your hands. Until more economical turbo-jet engines are devised and greater fuel capacity is built into the aircraft, time is important. Complicate a jet flight by gunnery runs, navigation from and to a carrier, rendezvous time, tactical maneuvers and the rest, and



the actual period you spend going and coming must be figured very closely indeed. As Joe says,

Plan, brother, plan with care,

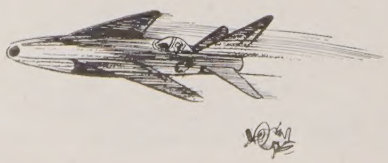
For every minute you're in the air.

When Dilbert hits the silk because he's out of gas, he's hitting the taxpayer where it hurts the most. A man can buy a boxcar full of washing machines for his wife with the money it costs to purchase a single jet airplane.

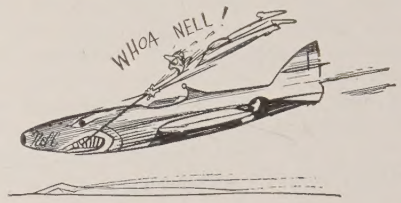
The pilot we left patting the yoke of his PBY a while back has a question. "Why," he wants to know, "why fool with the jet at all when the Navy already has aircraft well adapted for carrier operation? They were good enough in the last war."

That war is over with; on the other hand, we're not yet ready to fight the one that may happen a hundred years from now. No matter what you hear about push-buttons, underground cities, flying discs, and the rest, the chances are the same old military principle will stand up: the side that moves fastest with the most will win. The history book pictures of the gent who talked about "gittin thar fustest with the mostest" may look as faded as Aunt Minnie's tintype but what he said will always make sense in a war. Speed is essential.

The jet aircraft has speed. No conventional aircraft can match it.



But anytime a human being moves faster than a slow crawl, he can get into trouble. A savvy pilot includes "S" for speed in his PoinTS to remember because he is conscious of the advantages and the drawbacks of moving rapidly. A military aircraft must have speed, but it has to be *controlled* speed. The jet aircraft is fast enough to get Dilbert into a peck of trouble.

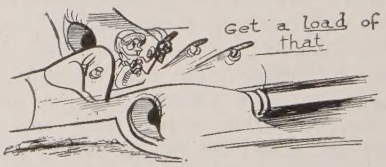


It looks fast. There's no 13-foot prop to clear the deck so the landing gear is just low enough to allow the necessary angle of attack for take-off and landing. Drag surfaces are at a minimum. The biggest drag factor of all, the prop, is just not there. In the air, the jet is smooth to handle; vibration is way below the level you're accustomed to in a conventional plane. The jet can go.

"Let her rip," says Dilbert.

"Hold it a minute," says the canny J. Jet.

Before he becomes involved with very high speeds, the smart pilot studies the aerodynamic characteristics of his aircraft. He wants to know what it does at its buffet boundary. He finds out where buffet occurs in terms of Mach number, indicated airspeeds and altitudes. He knows already that rough air means a rough ride at a high-tailing pace. By having the word on compressibility effects, he'll avoid getting his bumps from buffet. Since the jet is most efficient at high altitudes, where compressibility effects are felt at lower true airspeeds, he will fly up there but will keep a hawk's eye on his attitude.



The idea of controlled speed is ever on Joseph's mind. Any aircraft, conventional or jet, being worked over by compressibility effects continues to go fast, but it may not stay in one piece. Or it can "tuck under" and assume the trajectory of a bomb, with Dilbert yanking frantically at the stick. Even Joe can find himself at the buffet boundary in a dive, but he will not aggravate the effects by trying to pull out too fast. The "g's" will get him if he doesn't watch out; so he pulls back slowly but firmly. Some jet aircraft are fast enough to begin nibbling at the critical transonic speed zone and Joe Jet knows that a multitude of new

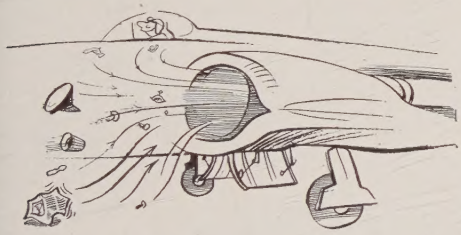
flight safety problems are coming up. He likes to go fast but he does it respectfully.

Plan, Time, Speed.

A polite regard for the PoinTS system will enable Joe Jet to show his press clippings to his grandson.

Our death-defyer turns out to be a sharp pilot. A flight with J. Pendennis Jet in his twin-engine job when the cameras aren't grinding and the magazine writers have gone home will clinch the argument.

Flight plan firmly in mind ("P" and "T"), he takes his place in the cockpit, pleased as always by the simple engine instrument panel in front of him. Before he makes a move about turning them over, Joseph buttons up his harness, fastens his 'chute straps, and so on. The last minute pulling and tugging the prop-pilot performs while his engines are getting hot would mean wasted fuel in the jet, which requires no warm up. In fact, Joe will not give the starting signal until he's ready to taxi.

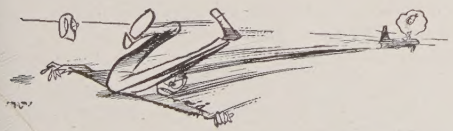


Everything looks OK. Joe sees no loose articles or people up front to be drawn into the inlets by the powerful suction of the

BEWARE OF

~~PROP~~ JETS

engines. No first cousin to Dilbert has his face up against the exhaust nozzle either.



The jet exhausts are not flame throwers, but the gases come out at such terrific velocity that up close they're hot and potentially dangerous. After he starts up, Joe will no more aim those exhausts at people than he would blast an innocent bystander with a slipstream.

Gas on, throttles in cut-off position, battery switch *off*.

Joe signals for auxiliary power and holds the starter switch down a few seconds. A sequence of events timed with relays does the rest: Joe just hits the starter and sets his throttles. Auxiliary power winds up the turbine to speed, fuel flow begins, the spark lights the mixture. In some models, the engine starts with a dull "Whoom;" in others, it's hard to tell when the fire is lighted. Some whoom, some won't.

There it is, idling.

Like a mountain boy eyeing a squirrel, Joe keeps a sharp watch on tail-pipe temperature. A hot start is bad business in a jet because excessively heated gases flowing by the turbine wheel may put it out of whack. The needle doesn't flick over the red line for even a second if Joe makes a good start.

Chocks out, Joe's ready to taxi. He advances the throttles smoothly and slowly. If he rams them forward, he knows he'll get a critical drop in fuel pressure; the result: less thrust, higher engine temperature, and possible damage to the working parts. It's a jet maxim that *the slower the engine is turning over, the slower the pilot advances his throttle to keep the engine cool.*

The jet likes a man that takes his time.

It's a great temptation to taxi a jet too fast. Joe sits well forward of the wings, with no props in his way. He can see. There's no sense wasting time with all that fuel being used up, but J. P. observes the local rules. As he taxis, he controls direction with light taps on the brakes because he can't use the throttles for that purpose on the jet. He's still watching tail-pipe temperature too.

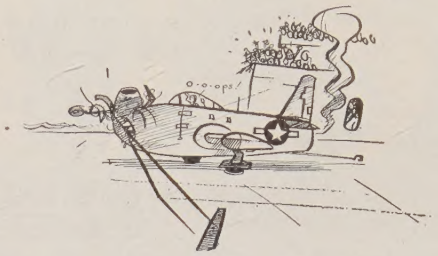
In the take-off spot, Joe holds his brakes and turns up the engines. If they show full RPM's, he's ready to go—no mags to check, no warm up. He makes sure the generator cuts in at the right time and turns on the emergency fuel system if the pilot's handbook calls for it.

With no prop blast working on the rudder, Joe may need brakes at the start of his run. After he's airborne, Joseph stays low until he has the speed he needs. The most efficient climbing speed of a jet is a lot faster than prop pilots are used to and our boy doesn't start his climb until he reaches it.

(Is Monsieur Jet keeping his mind on Plan, Time and Speed? He is.)

Back in the vine-covered cottage, Myrtle is wringing the wash, not her hands; she even whistles while she works. Next door, the ensign's wife worries because her man is flying an SNB all the way to Norfolk. Myrtle hopes the young fellow remembered to check his mags.

His mission completed, Joseph P. loses speed and altitude, still keeping a wary eye on the fuel guages and the clock. Landing is no strain or pain but he doesn't forget that with so much of his fuel weight gone he'll come in light and float farther. For Dilbert the story may be different. He'll tend to overshoot or undershoot because he won't take the trouble to learn the accelerating and decelerating characteristics of the jet.



Carrier operation would have made the flight more complicated for our man. "T" for time would have been more important, with rendevous accomplished on the double and navigation checked and rechecked. There's no time to hunt for lost carriers.

The best methods of getting back aboard are still being studied. The old-fashioned way still seems to be the best, with the following advice from Joe to take care of special jet characteristics:

1. Lose altitude early, come around crosswind, and into the groove flat. This way, if you get a wave-off you'll already have power on. You can't ram the throttle forward and expect the same immediate response you obtain from a conventional plane. The LSO knows this and will commit you sooner.

2. Line up in the groove slightly farther astern. You won't lose the LSO because visibility from the jet is so much better.

3. Get set for the cut sooner. The light jet will float farther.

4. Be prepared to do some of your most important flying after the cut. The jet doesn't have that fine big difference in stall speeds, power on and power off, that propeller planes have. It flies longer.

A good many problems remain to be ironed out before the jets will be making routine flights from carriers, but the day is not far.

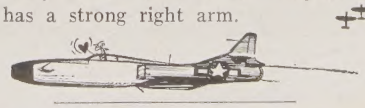
The jet is here to stay. Building a jet fighter was a logical beginning to the Navy's program because of the speed advantage, but other types are on the way. So it's a smart idea for every pilot to get straight on the scoop and whoosh now.

No hot rocks need apply. Test pilots say that flying the jet requires the cool, canny approach of an aviator who can figure the angles. Joe Jet was no Superman but he had sense enough to go into a huddle with himself before he took off. He *planned* his flight and he *timed* it. He flew his plane to take advantage of its speed, but he did so with full knowledge of the dangers involved.

When you fly the jet:

*P*lan your flight carefully;
*T*ime yourself;
Watch that *S*peed.
Know your *PoinTS*.

The jet airplane is like the beautiful gal on the next street who was brought up to be a lady. You'll love her and respect her. She has a strong right arm.



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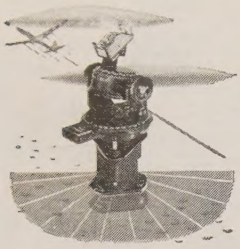

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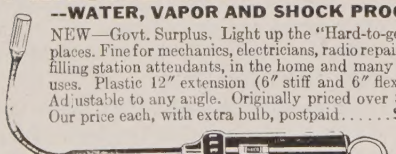

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Balanced Security

Congressional program for 70 Group Air Force puts prospect of balanced security in hands of plane industry

AN EDITORIAL

PROBABLY the greatest confusion in the public mind today is over the question of just what constitutes a balanced defense for the United States. As we go to press, Congress is still battling over details of the program, but there is no longer much doubt as to the outcome.

The 70 Group Air Force proponents have won over the opposition of the Army, the Navy, Secretary of Defense Forrestal and the White House, after one of the bitterest internecine struggles in our history. Some sort of Selective Service is a certainty, but Universal Military Training, as the President outlined it, has simply had no chance in this election year. Church groups, educators, labor and the peace-at-any-price agitators have joined with a lot of plain citizens who could see no profit in spending billions on training thousands of young men for service under the conditions of potential atomic war. Our handful of divisions, even with UMT, pitted against the tremendous strength of the Soviet ground forces is a possibility that no one enjoys contemplating.

If there should be shooting, then the air way—both Air Force and Navy—would be the only way in which we could hope to win. To quote from the Compton Report on UMT, "Our first requirement is a mobile striking force, relying heavily on air power to stop the enemy's attack and hit back at him with all possible force. We believe that a potential enemy's reluctance to start a war and his handicap in prosecuting it successfully if started will be in direct proportion to the power and readiness of our mobile striking force. — We realize there may be a danger if our country puts Universal Military Training into effect, since it will therefore be lulled into a feeling of false security. There may be a tendency for this reason, coupled with a natural desire for economy and lower taxes, to offset the expenses of the UMT Service by a curtailment of one or more of the other military elements of the national security—intelligence, research and development, mobile striking force, regular army and navy and air force, national guard, maintenance of equipment and industrial preparedness. If the introduction of UMT should have such an indirect effect,—then your Commission is of the firm opinion that adoption of UMT would be a mistake and would diminish rather than increase our national security."

It is quite true that the Congress of the United States has found in the 70 Group Air Force program the least expensive way to an approximation of security for the country. It is why its acceptance by the country has been so widespread. The feeling has grown steadily that we can no longer rely on outmoded forms of military preparedness to give us actual strength in cases of emergency. The shadow of the airplane and the atom bomb hangs heavily over the thinking of every citizen.

Probably the clearest exposition which has been made concerning the necessity of beginning immediate development of air power has come from Rep. Carl Hinshaw (R. Cal.), Vice Chairman of the Congressional Aviation Policy Board and Chairman of its Combat Sub-Committee. Testifying recently before the Senate Appropriations Committee, Mr. Hinshaw said: "There is another aspect of the problem which is possibly more vital than the provision of any number of groups of airplanes that may constitute the Air Services (Air Force and Navy) striking force. That is the production capacity of the factories which must supply the aircraft and their components. It is a well-known fact that, starting from any given rate of production, it takes from a year to a year and a half to double production, and then it may be doubled again in from 6 to 9 months and doubled again in 3 months, assuming that an all-out order is given. The experience of World War II when the President's 50,000 aircraft program was placed in motion, and with the utmost we could do, there was a lapse of four years before maximum production was reached. It increased in something like geometric ratio, but at any given time the current production was a multiple of the base production at the time the order was issued.

"Today, we have a military production rate in the aircraft industry on the order of 21 million pounds of airframe per annum. At the same time, we are withdrawing from war surplus storage about 43 million pounds per annum. It has been indicated to our committee that the effective aircraft in storage will have been completely withdrawn, mostly by 1950 and a few types early in 1951. The date given us when other nations will be able to use the atom bomb is 1952. But, if the present production rate is to be increased to keep the Air Services at merely their present strength in 1950 or 1951, unless orders are placed now, the industry cannot possibly be expanded to the production rate of 64 million pounds by the date the effective storage aircraft will have been withdrawn."

Congress acted on that basis. Now our prospects for a truly balanced security is once again in the hands of the aircraft industry.

J. FRED HENRY